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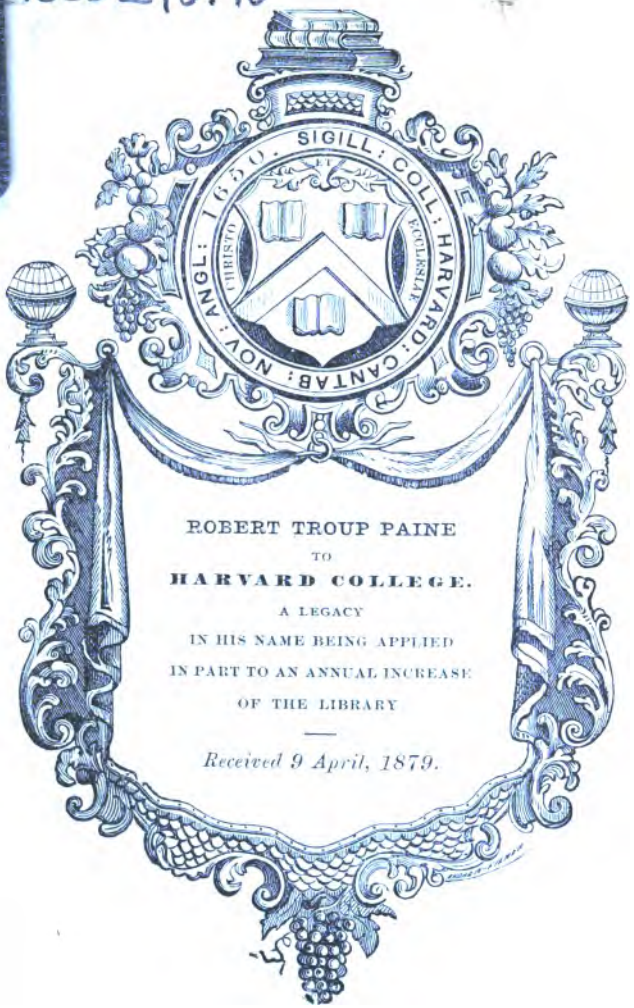

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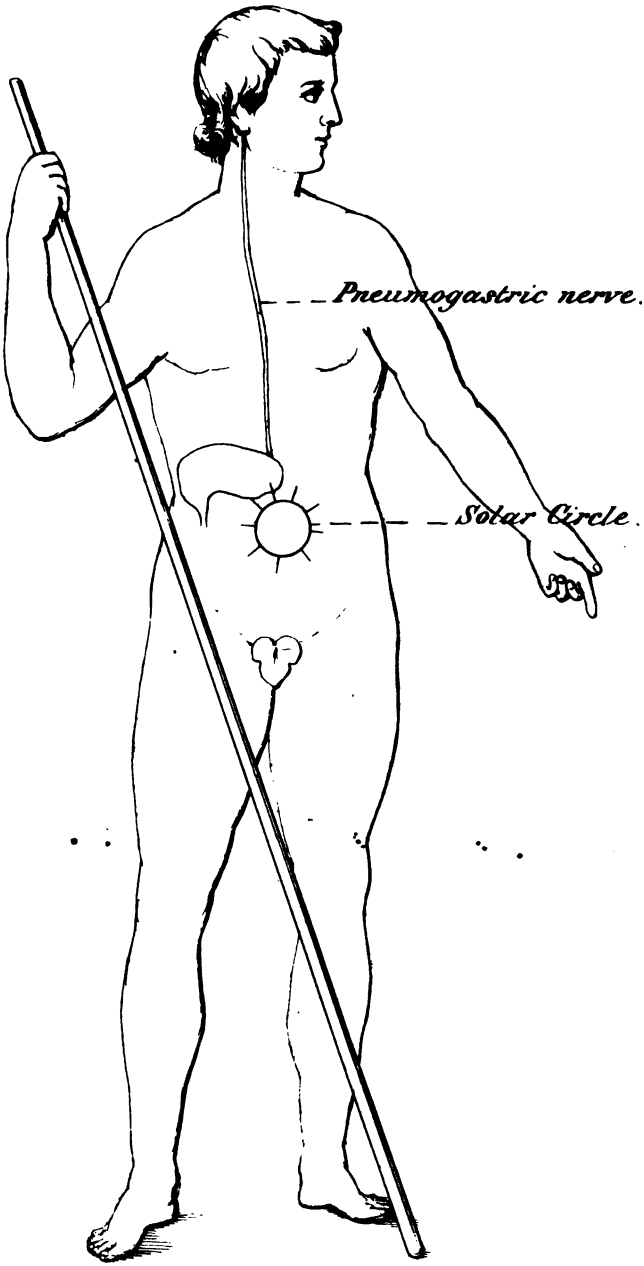
Pneumogastric nerve.
Solar Circle.

BENEFICENCE OF DESIGN

IN THE

PROBLEM OF EVIL,

VINDICATED BY

THE LAW OF CAUSATION

IN THE

PHYSICAL CONSTRUCTION OF MATTER.

Robert Troup Paine

BY

to A JOURNEYMAN.

Harvard College

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TO THE

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OF

THE MEDICAL PROFESSION,

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RESPECTFULLY AND AFFECTIONATELY

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CONTENTS.

PAGE

INTRODUCTION 9

CHAPTER I.

THE THEOLOGY OF NATURE MUST HARMONIZE WITH THE THEOLOGY OF THE BIBLE 13

CHAPTER II.

WHEN MEN BEGIN TO THINK THEY BEGIN TO REASON OF THE LAW OF THOUGHT 30

Hypotheses the Origin of Law 30

DYNAMICAL PHYSIOLOGY.

CHAPTER III.

DYNAMICAL PHYSIOLOGY 45

Proximate Cause of Motion . . . 50

CHAPTER IV.

PAGE

MOTIVE ATTRACTION 54
Oxygen the Cause of Attraction . . . 57
Force of Attraction sustained only by an accumulation of Material 59
Force in Matter curvilinear 62
Sensible Heat 67
Oxygen the Cause of Light 68
Thermo-Electricity 69

CHAPTER V.

MATTER 72

CHAPTER VI.

ALL MATTER VITAL 81
Difference of Structure in all Matter . . . 82
Their Mode of Combination 83

CHAPTER VII.

OF WATER—OXYDE OF HYDROGEN, H. O. . . . 88

CHAPTER VIII.

FORCE 91
Oxygen the Supporter of all Combustion, and yet Incombustible 94

SENSATIONAL PHYSIOLOGY.

CHAPTER IX.

PAGE
Sensational Physiology 99
Spontaneous Organization 101

CHAPTER X.

Sensational Attributes 106

CHAPTER XI.

Sensational Physiology of Man 109
Order of Succession 110
Cause of the Circulation of the Blood . . 117
Algebraical Law 121

MENTAL PHYSIOLOGY.

CHAPTER XII.

Nervous, Medullary, and Cerebral Systems of Relation 137
Infancy 144
Childhood 147
Memory 150
Imagination 150
Will 153
Conscience 155

PAGE

Sensation and Conscience—their relative powers contrasted 158
Emotions and Passions 159
External Perceptions of Sight and Touch, together with their different rates of motion, and different spheres in which they respectively move . 161
Medulla Oblongata 166
Brain 167
Responsibility 171
The Human Mind has two methods of arriving at a conclusion:—importance of knowing the distinction 172

CHAPTER XIII.

What is Truth? 175
Object of the Law of Causation 186
Law of Causation—a Pre-Human Law 187
Logical Order of Mind 189
Holiness 191
The Curse 192
Reconciliation 196
Death and Resurrection of the Saviour Jesus Christ 197
General and Special Providence considered in reference to the General Law 204
Beneficent Design in the Necessity of Evil . 210

INTRODUCTION.

In the present state of the sciences, there would be a strong presumption against any pretence of giving to the world a new theory of mind or matter, through the medium of the Deductive System.

This work, which is a truthful transcript of the writer's mind, looks only at *causation*, and he begins it in the *basis of his profession*, with the *cause of physical evil*, and then attempts to show, by causation, *beneficent design* in creating man *physically*, *morally*, and *mentally*, a complex problem of evil.

The originality of the work starts in a definition of hypotheses, at variance with their ordinary interpretation, and shows in their distinction the origin of law; and the next step places the whole

treatise beyond the present boundary of science, to await the verdict of a discerning public.

It assumes oxygen to be a generant hypothesis, and works out of its phenomena a Law of universal causation, that no circumstance except one can defeat; and that one is anticipated by omniscient foresight, and provided for by special intervention.

Man is made, physically, morally and mentally, by this law, out of the elements of common matter, with his atoms differently arranged; and the law explains its own government of his physical, moral and mental state, in the order of their natural succession.

After displaying his moral and mental state thus disciplined by law, his physiology proceeds to show that the human mind has two modes of ratiocination, and two methods of coming to a conclusion:—the one by contingency, where truth may be found by accident; and the other by facts, which form a judgment to be relied on: and unless this distinction is clearly comprehended by the mind, it does not perceive which method of ratiocination is pursued, and hence follow so many false judgments. The physiology then closes by demonstrating man's responsi-

bilities to rest in his highest mental attributes, instead of the lower range of his feelings.

His moral and mental physiology being finished, his mental attributes are analyzed, and prove how he will act in given circumstances. This introduces the most difficult questions in Theloogy, and defines the extent and boundary of the transgression and fall of man; explains the curse; reaches that great central point of Christian doctrine, the reconciliation of man to God; and lastly, grasps the great problem of the death and resurrection of our Saviour, and lays open the law that carried him to the cross; and closes with beneficent design in the necessity of evil.

It furnishes matter, *first*, for the Philanthropist; as it accounts for the cause of physical and moral evil.

Secondly, for the Philosopher; as it explains the cause and phenomena of perpetual motion.

Thirdly, for the Legislator; as it lays open the law of universal causation, from which all minor laws spring.

Fourthly, for the Chemist; as it gives a law to his science.

Fifthly, for the Physician; as it shows him the cause of life, and its higher relations of mind and soul in its connections with matter.

And *finally*, for the Theologian; as it explains the most difficult questions in theology.

BENEFICENCE OF DESIGN

IN

THE PROBLEM OF EVIL.

CHAPTER I.

THE THEOLOGY OF NATURE MUST HARMONIZE WITH THE THEOLOGY OF THE BIBLE.

BALTIMORE, January 1st, 1849.

LAST evening, a lady read to me, in Littell's Living Age (No. 235—18th of November, 1848) an imaginary production, in which the author supposes different systems of our universe to have been made by different angels, who, when they came to preside over their works, ran into collision, producing all the physical evils he portrays, as the natural result of divided councils.

The directive tendency of the essay seems to have been to expose the fallacies of some of the Bridgewater treatises, which, instead of meeting the question of physical evil fairly, have attempted to gloss over the painful experience of its truth.

Imaginary as the propositions were, they gave me a sleepless night; and this morning I have taken here and there from the essay mutilated fragments, and arranged them in my own order, and introduced into them the *cause* of physical evil, with the design of writing out a tenth Bridgewater treatise, more in accordance with what seems to have been the Earl of Bridgewater's primal intention.

Having put a new meaning into the author's language, I dare not pass it to his credit, lest it might be making him say what he would be unwilling to agree to; and therefore, I refer the reader to the original, hoping the author, whoever he may be, will excuse the liberty I have taken with him.

"The scriptural declaration that 'all flesh is grass,' admits of the most literal chemical

interpretation. The plants on which animals feed, contain not merely the elements of their bodies, but their very substance."

Potatoes, starch, wheat flour, milk, red blood, fat, muscular fibre, are the same bodies, with their particles differently arranged—all that is in the one is found in the other. Now the minerals, but more especially the metals, out of which these elements spring, are the most abundant chemical agents, 46 out of 60 being metallic, and the remaining 14 non-metallic.

There is not one of these metals in itself poisonous, not even arsenic, mercury, or copper. It is not until they *begin their work* that they become poisonous—until they enter into combination with some non-metallic substance; and no substance is so effectual in rendering them poisonous as that self-sustaining power, Oxygen, which afterwards enters so deeply into our own composition, as to make itself the source of our vital heat. "The poison, arsenious acid, for example, is a compound of the metal arsenic and oxygen, nei-

ther of which is separately poisonous—the deadliness of the resulting body is more indebted to the oxygen than the arsenic; and so with similar compounds. Moreover, oxygen, hydrogen, nitrogen and carbon, the characteristic elements of plants and animals, have only to unite with each other to form compounds much more deadly than any mineral poisons. Thus the chief constituents of air, nitrogen and oxygen, combine to form nitric acid; carbon, nitrogen and hydrogen make up the most terrible of all poisons, prussic acid; and these are not solitary cases, for the same elements form, by combination, many other compounds scarcely less deadly."

On inquiry, then, it appears that every chemical element becomes by combination a poison; and as the globe and its inhabitants are made up of these elements, that poisons were preparing to enter into our composition before the foundation of the world was laid.

But, secondly, the problem that physical evil was introduced into the world before man was brought upon its theatre for action, is

seen in its appearing in connection with animal life, "where together they have reigned side by side, ministering to each other and to death, not only since man was placed upon the globe, but for untold centuries before." Pain and death, thus associated before man was made, seem to trample upon beneficence and efface design.

"Geology supplies the testimony that death has triumphed throughout the early epochs of the earth's history, and the leaves of her stone book have written on their pages, not merely the records of death, but likewise of *pain*. The fossil fishes which abound in many of our strata are not found stretched out in the postures of repose which they would have assumed had they perished calmly; but like men who die in battle with agony upon them, their bodies are thrown into violent contortions. Each has petrified its last convulsions, and, like the Laocoon and the dying Gladiator, shows its mortal throes sculptured in stone."

These immortal agonizing statues are not

strange or solitary figures:—the far-famed Elgin marbles of the British Museum express the agony which the fighting Centaurs and Lapithæ have worn for ages. Whatever else be observed in these beautiful works of art, he who runs may read in them a plain tale of combat and strife—a struggle for life and death; mortal blows struck, pain relentlessly inflicted, and weakness giving way before strength which unsparingly smites it down. And when we leave these wondrous sculptures, and pass to the geological hall, another set of friezes appear, older by ages, and perhaps by millions of years than those of the Parthenon, carved by a chisel, far excelling that of Phidias, telling of creatures stranger even than centaurs, and of battles more terrible than those that have been fighting in marble for centuries between these monsters and their foes. Different, however, as every thing else is, the story is the same.

The heroes of these geological bas-reliefs are Ichthyosaurs, Plesiosaurs, and Pterodactyles, lizard-birds, gigantic crocodiles strange-

ly compounded, and Titanic Gorgons and chimeras dire, such as we thought could be witnessed only in nightmare dreams, till with forms more hideous than eye had seen, or ear heard of, or it had entered into the heart to conceive, we gaze with wonder on these stone effigies before us. In their lifetime those strange beings were all of them warriors. The mortar cap, the chiselled chain-shirt and cross-hilted sword of a recumbent monumental figure do not more plainly tell, that below lie the bones of a soldier crusader, than the fierce jaws, huge rows of dagger-like teeth, cruel fangs, sharp claws, and other accoutrements of those stone mummies, proclaim that their possessors were the Black Hussars of the pre-Adamite world, and gave no quarter.

The Parthenon figures only repeat the story of the Gorgon frieze. In the latter we as plainly read as in the former, battle and murder, strength remorselessly vanquishing weakness, and the victim reaching death through the appointed stages of torture and agony.

This tale of suffering, like those dark legends which are found in every country, is repeated all over the globe. Wherever the geologist digs, he finds pain graven on the rock forever. A museum of fossil bones is like the arsenal of a warlike nation—weapons of destruction, teeth, claws and horns, the swords, daggers, and spears of life militant, far outnumber toothless jaws and inoffensive mouths, the reaping-hooks and ploughshares of the peaceful herbivera.

We have referred only to past evidence of pain, because we wish to plant here the historic evidence that physical evil is older than human happiness; and lastly, because it proves what we wish to insist on in the face of all attempts to gloss the fact over, that physical suffering is no incidental, transient, or as it were interpolated thing; but that, historically, it is ingrained, and inseparably interwoven, into the whole fabric of our system, from the commencement.

It is not by accident that a beast of prey kills; he was made to destroy; and the joyous

child, the tender girl, the happy boy, and the vigorous man, were born to die, with deep capacities of enjoyment unsatisfied, and a thousand desires unfulfilled.

The coexistence in this world of life and happiness, suffering and death, has led some to suppose that the earth exhibits the results of divided councils; but he who will attentively observe the phenomena of light and shade, how intimately their blended hues depend upon the relation that each bears to the other, and the splendor of the rays that spring from the slightest change of distance, and are as suddenly dimmed by another, will see that one God orders the whole, and that the evil and the good are naturally intertwined and inseparable from each other. What is evil in one aspect, is good in another; and the two must be taken together, that we may comprehend the whole.

The process of breathing the air was the finishing function of life to our first parent, and the same order of structure and function is preserved for the race. The air that was

blown into his nostrils was the breath of life; and if that life was to be taken as a specimen of the properties of the air that produced it—if the chain of causation was to follow unbroken from the principle to its development, we need not marvel at the strange mixture of good and evil that man exhibits in his human nature. This air, though simple in its combinations, is made up of properties with which we are familiar. Oxygen and nitrogen possess properties so wonderful, and yet so dissimilar, that we are as slow to believe they can exist together, as that good and evil can harmoniously commingle. "It rises above us, arching towards that heaven of which it is the most familiar synonyme and symbol. It floats around us like that grand object which the apostle John saw in his visions:—'a sea of glass like unto crystal.' So massive is it, that when it begins to stir, it tosses about ships like playthings, and sweeps the cities and forests like snow-flakes to destruction before it: and yet it is so soft and gentle, that we have lived years in it before we can be per-

suaded that we are breathing it; while the great bulk of mankind never realize the truth that they are always bathed in an ocean of air."

Its weight is so enormous that iron and steel shiver before it like glass; yet a soap-bell sails through it with impunity, and the tiniest insect waves it aside with its wings. We touch it not, but it touches us. Its warm south breeze brings back color to the pale face of the invalid; its cool west winds refresh the fevered brow, and make the blood mantle in our cheeks. Even its north blasts brace into new vigor the hardened children of our rugged clime. The eye is indebted to it for all the magnificence of sunrise, the full brightness of mid-day, the chastened radiance of the gloaming, and the clouds that "cradle near the setting sun."

But for it the rainbow would want its triumphal arch, and the winds would not send their fleecy messengers on errands round the globe. The cold air would not shed its snow-feathers on the earth, nor would drops of dew

gather on the flowers. The kindly rain would never fall, nor hail-storm nor cloud diversify the face of the sky. Our naked globe would turn its tanned, unshadowed forehead to the sun, and one dreary, monotonous blaze of light and heat dazzle and burn up all things.

Were there no atmosphere the evening sun would in a moment set, and, without warning, plunge the earth in midnight darkness.

But the air keeps in her hand a sheaf of his rays, and lets them slip but slowly through her fingers; so that the shadows of evening gather by degrees, and the flowers have time to bow their heads; and each creature space to find a place of rest, and nestle to repose.

In the morning the garish sun would, at one bound, burst from the bosom of night, and blaze above the horizon; but the air watches for his coming, and sends at first but one little ray to announce his approach, and then another, and by and by a handful; and so gently draws aside the curtains of the night, and slowly lets the light fall on the face of the sleeping earth, till her eyelids open, and, like

man, she goeth forth again to her labor till the evening.

To the ear it brings all the sounds that pulsate through it;—the grave eloquence of man, the sweet songs and happy laughter of women; the prayers and praises which they utter to God; the joyous carol of birds; the hum of insect voices; the whisper of the winds when they breathe gently, and their laughter and wild choruses when they shriek in their wrath. Had there been no atmosphere, melody and harmony would not have been, nor any music. The earth might have made signs to the eye, like one bereft of speech, and have muttered from her depths inarticulate sounds; but nature would have been voiceless, and we should have gazed only on things that were dumb.

To the last of the senses, the air is not less grateful than to the others. It gathers to itself all perfumes and fragrance from bean-fields in flower, and meadows of new-mown hay; from hills covered with wild thyme, and gardens of roses. The breezes, "those heavy-winged thieves," waft them hither and

thither: and the sweet south wind breathes upon banks of violets, "stealing and giving odor." It is the girding and encircling air which flows above and around all, that makes the whole world kin.

The carbonic acid, with which our breathing fills the air, to-morrow will be speeding north and south, and striving to make the tour of the world. The date-trees that grow round the fountains of the Nile drink it in by their leaves; the cedars of Lebanon will take it up to add to their stature; the cocoanuts of Tahiti will grow riper upon it; and the palms and bananas of Japan change it into flowers.

The oxygen we are now breathing was distilled for us some short time ago by the magnolias of the south and the great trees that skirt the Oronoko and the Amazon. The giant rhododendrons of the Himmelayahs contribute to it: the roses and myrtles of Cashmere, the cinnamon trees of Ceylon, and forests older than the flood supply it.

The rain which we see descending was thawed for us out of icebergs which have

watched the polar star for ages; and lotus lilies sucked up from the Nile, and exhaled as vapor, the snows that are lying on the tops of our hills.

The air is our foster-mother, and nurses each one,—men of all kindreds, and people, and nations; four-footed beasts and creeping things, fowls of the air and whales of the sea, old trees of the forest, mosses wreathed upon boughs, and lichens crumbling on stones, drink at the same perennial fount of life which flows freely for all. Nursed at the same breast, we are of one family—plants, animals, and men —and "God's tender mercies are over us all."

But now let us lay aside every attempt to take advantage of this picture, and calmly ask ourselves what we are entitled to build upon the truths we have stated.

That same atmosphere which brings summer showers, brings winter rains; sends chilling east winds, cold frost and pitiless hail-storms; scatters the seeds of a thousand diseases, and fans and nurses them till they ripen

unto death; excites catarrhs and fevers, and sweeps their victims to the grave. Its diffusive power is not more ready to intermingle the vital oxygen with the other elements of the air, than it is to carry the subtle poison of plague or cholera round the globe. But for it, miasms and malaria would confine their ravages to the spots where they generated; but to the air they are as welcome as the choicest perfumes of flowers. It will take no refusal, but adds each to itself, and every living being is compelled to drain the poisonous cup. It has its warm zephyrs and beneficent trade-winds; but it has also its monsoons and tornadoes, its whirlwinds and hurricanes, which depopulate whole islands and sweep the earth like the besoms of destruction.

It has its small rain for the tender grass, its warm mantle of snow-down to lay over the young plants till spring shall come, its refreshing dew for the sleeping flowers; but it likewise holds in its right hand the thunderbolt which shatters navies to fragments, and the lightning that consumes them with fire. How

many have died of diseases from the air, whilst we have been rejoicing over its exquisite adaptation to the necessities of life!—Hundreds of sufferers have been agonizing under the wasting pangs of consumption, whose lungs were made to breathe the air provided for them, while it is now burning up the body and maddening it with fever. The once bland and innocuous nitrogen is now exciting fierce fits of coughing—each note a death-knell. The water vapor, so necessary to life, is bursting forth in clammy perspiration, swiftly stealing life away.

Our argument set out by declaring that air was furnished for the means of living, and it ends by acknowledging that all who use it die.

If our first parent, then, was made of elements so wondrous, and yet so dissimilar, can we marvel at the lights and shades in human life, or suppose for a moment that divided councils reigned in the time of his creation?

CHAPTER II.

WHEN MEN BEGIN TO THINK THEY BEGIN TO REASON OF THE LAW OF THOUGHT.

HYPOTHESES THE ORIGIN OF LAW.

PHYSICAL and moral evil are so intimately blended in our daily experience that we feel our bondage in the passing moment, while the law that governs their footsteps is hid in the mystery of the past.

In vindicating the beneficence of design in the problem of evil by a law, the law stands first in logical order, and the *distinction* in hypotheses will exhibit its origin. There is a leading tendency in distinguished minds to suppose hypotheses to be the subject of *induction only*, and to be tested by the rule of logic laid down by Lord Bacon—a mistake that

has lavished the highest attainments of the human mind.

Hypotheses are the subjects of investigation, and before we abandon one the mind should discern whether it will generate another. If it will not, it is barren; if it will generate a second, it is productive; and if the two will generate a third, they together establish a ternary law of reproduction. Now we have binary, ternary, and quarternary combinations, which severally yield different forms of matter, and to which we have affixed definite laws, that are limited to classes, genera, and species: a limitation and subdivision into laws which the general law regards as an invasion of its principle. The law classifies its own order of arrangement into phenomena; and the mind that has not rightly observed the unbroken order of the law, is led to suppose the classification to limit the law, and make hybrids, in which there is no element of reproduction.

It is here the confusion in science begins, by interrupting the unbroken order of the

law, and supplanting it by ideal laws of its own.*

For in looking at the chain of causation we behold the uniformity of the law to proceed unbroken, and hybridity, either in mineral, vegetable, or animal life, to be the result of accidental circumstances, that transitions render reproductive; and from whence the law rises from ternary to quarternary compounds, when it leaves the ground of simple combinations, enters into arithmetical progression, and proceeds in the fulfilment of its destiny into fractional relations, assuming the dignity of a law whose *force increases as the combinations multiply*, from an atom to a mineral, from a mineral to a globe, and from a globe to a solar system; and in animate life, from a mineral to a vegetable, from a vegetable to an animalcule, from an animalcule to an animal, and from an animal to man, the highest attainment of the law.

This statement of a general law has sprung

* Mr. J. Stewart Mill, in his system of logic, writes *laws of number*, instead of *law of numbers*.

from a *generant* hypothesis found in my mind, which is a kind of box or drawer into which I have been throwing hypotheses in their transition state from childhood to maturer years. The order in which they are thrown in, if left to its own arrangement, would bring out nothing but confusion.

The minds of men differ, not so much from a want of hypotheses, as from a want of order in their arrangement; and on a closer inspection it is perceived, that the order of arrangement, in all minds, takes its tinge somewhat from the disorder in which they were thrown in.

Some minds again, with an over-stock of hypotheses, never reach an arrangement; while there are others, with a small capital of notions, who, by a lucky adjustment of them, have made themselves felt in the world of matter and mind.

The individual mind is marked by the proportion of its thoughts that are brought into the order of a general law; and yet, in its highest attainments, the order will differ—and

hence there must always be collision of opinion.

When, in those minds, the proportions of a general law more approximately harmonize, the minds of men assimilate, and they assemble together in cliques of different orders.

Certain combinations of the law in the mind of one individual, will send it entirely away from the assembled minds of men, to sift out its own atoms and traverse its own combinations, through arithmetical progression, into its highest fractional relations; and when he has worked up every fragment in his drawer, he suddenly beholds what were hypotheses promiscuously commingled, when put in their successive order, stand forth in the beauty and harmony of a general law.

This appears to be the present condition of my mind. It has worked up every fragment into a general law; and in doing so, I have been gradually diverging from the current of mental travel, till I have parted, one by one, with all my associates, and find myself alone, but not in a wilderness of thought, for I have

my law, which stands in such beautiful symmetry in my own mind, that it is difficult to conceive it should stand in any other form, in any mind. Yet, when I come to examine the special acts of the law, and see the different directive tendencies which its various combinations will give to different minds, I can expect but few to follow the road that has led me to my conclusions. And I may perhaps apprehend, in a humbler way, what Sir Isaac Newton foresaw, when he had demonstrated the great law of the attraction of gravitation —that he could patiently wait a hundred years for a reader, as God had patiently waited so many centuries for an observer.

The present state of science is so graphically written by Mr. J. Stewart Mill in his system of Logic, that I take leave to introduce it to the reader in his dress, not meaning to wear it, as my title sheet promises something new. "Simple as the law of gravity now appears to be, and beautifully in accordance with all the observations of past

and present times, what an immense amount of intellectual labor has it cost!

"Copernicus, Galileo, Kepler, Lagrange, Laplace, all the great names which have exalted the character of man by carrying out trains of reasoning unparalleled in every other science, each of whom might have been the Newton of another field, have all labored to work out the consequences which resulted from the single law that he discovered; the brightest in genius, and the most persevering in application, have lavished their powers on the details of the law of gravity.

"If such is the view we must take of the laws of inanimate matter, of which the law of gravity discloses less than is yet concealed from us—laws, in whose consequences it has cost so much of intellectual labor to penetrate, what language shall we hold, when we consider that there are other and higher laws —laws which connect life with matter—that the law of gravity throws no light upon:—that we are now in ignorance of the smallest link in that chain which holds life in its mysterious

connection with matter," or that still more miraculous one which connects mind with both ?"

These are the grave questions we propose to discuss, without the aid of inductive philosophy as our guiding star, under the heads of DYNAMICAL, SENSATIONAL, and MENTAL PHYSIOLOGY.

The reader may well suppose that we are to meet these questions on unequal terms, unless we first demonstrate a law that shall govern the whole series collectively, namely, a law that will account—*first*, for the cause of the attraction of gravitation; *secondly*, for the connection of life with matter; and *thirdly*, for the connection of mind with both.

It is true, as Mr. Mill states, that the limitations of the law of gravity have defined the boundaries of these sciences since the days of Sir Isaac Newton; and it is equally true, we think, that the truths of geometry being *illustrative* and not investigating, is the cause of this continued limitation.

Newton himself discovered the law by ob-

servation; and it may be said to have been the accidental work of a great mind, rather than the promptings of design to effect a particular discovery, as he did not know what he was searching for, till the falling of an apple from its parent stem suggested to his mind the existence of a law, and this hypothesis brought him to the process of induction to prove it. And being proved, it would not account for the motion of an atom of matter, or for the revolution of the planets on their own axes. It merely regarded them as so many water-wheels that could exert no more force than what had passed into them from some outward source of motion. At this point the law stops abruptly, and no further progress is made to account for the phenomena of motion in the atoms of matter.

The law leaves man where the student finds him, on the dissecting table, and where the knowledge gained from the dissecting knife will admit of little further expansion; the morbid phenomena disclosed by the instrument throwing no light upon the cause of the phy-

sical evil that brought him there. He begins his examination on a motionless object, and traces it through the progress of its decay and decomposition.

The time has arrived when we are to survey man in a different aspect. Instead of tracing his silent remains to its ultimate atom, we are to contemplate him as a being of life and motion, and trace him from his rudimental atom upwards, in the ascending scale of his complication, to his final combinations.

Physical evil is the appropriate field of the medical student; and as man is the measure of matter, all matter, in its widest-spread relations, constitutes the limits of his study. The cause of physical evil being discovered in the elements of matter, all sorts of moral obliquity and mental aberration must needs follow in the train of its combinations.

As a being of motion, I see a force working within me and without me and round about me, always in curvilinear lines of differing intensities, that seems to have formed to itself arcs of circumference, proportioned to the

number of combinations that enter into the mass, whether it be an atom or a world. On a closer inspection, the force is seen to act by the law of numbers, and is established on a rigidly mathematical basis; so that numbers and proportions of numbers and geometrical figures will express its atomic relations, together with the undying changes arising from oxydation in the atoms of all matter, whether that matter be organic or inorganic. Any thing that overlooks this force, leaps over the first elements of success in the investigation of all matter, whether the matter be active or passive in the operation of its law.

Entering into the discussion of the physical properties of matter, we see not the difference which the terms organic and inorganic seem designed to express; although we will use them, in deference to our predecessors.

We see in matter nothing *fixed but change*, measured only by the clock of time. What it now is, the next moment it is not, and is again. We see nothing in it lifeless or inert: the dust that is to-day, to-morrow may have

entered into new combinations, exhibiting the rudimental resurrection of life.

Following in its train, we see other atoms of matter rising and falling in the scale of being, just in proportion to the number of combinations that may have entered into their composition.

So that we see all matter to be vital; vital in its progress and vital in its destiny. Seeing things in these relations, we have taken man to be the problem for solution; because on man the problem of evil hangs most heavily: a problem holding in its connection other problems of equal magnitude and difficulty, whose wider-spread relations reach from the rising of the first morning star to every setting sun. But no other problem in the mysterious chain of causation has taken both a Bible to defend and the word of God to vindicate it, and still been left covered with the same impenetrable darkness that mantled it at its birth.

As we are to begin the discussion of our subject with dynamical physiology (the sci-

ence of moving powers), and carry up its law to where life unites itself with matter, and from thence to where mind unites itself with both; it must be apparent to the reader that as the law is to reach the whole phenomena of mind, somewhere or other in the course of the discussion, it must come in conflict with the great problem of moral as well as that of physical evil.

If the law of causation as it is explained in these pages be true, it must explain its own government, and disclose the end and object for which it governs; so that the destiny of all things lies concealed in the law.

The reader will first follow me through the construction of the law of motion, and then apply this law to the construction of man, physically, morally and mentally;—who being the measure of all things here below, must needs reflect his own light upon all his subordinate relations.

DYNAMICAL PHYSIOLOGY.

CHAPTER III.

DYNAMICAL PHYSIOLOGY.

THE discussion of the darkest problem of life must needs involve the consideration of its cause, and carry us back over a period of unknown centuries, to a time, when the Father and the Son entered into a consultation on the nature and constructive tendencies of the great law of *universal causation*, and bound themselves by a covenant transmitted to us through Moses, in which the Father himself was to preside over the general law, while the Son consented to the support of its special acts.

The mind of each being intimately cognizant of the remotest consequences of a general law, foresaw, that it could not compre-

hend within its grasp, the completion of its destiny, without the intervention of one of the parties. Special acts spring from the necessities of a general law, and comprehend acts out of the ordinary course of the law, and not at variance with its general principles.

On a close inspection, it is found that one of the special acts, rising out of the necessities of the general law, comprehends the whole Christian system of relations, which Christ the Son of God consents to see to; and man being the special subject of this great system, and coming directly within the dominion of the Son, required the concert and co-contrivance of the Two, in the construction of his physical, moral and mental nature.

"Let us make man according to our image and likeness." Now it is observed that the commanding verb "*let*," is used in the connection precisely as it was used before the connection was recognized in the narrative; which implies that man was made by the continuous action of the antecedent law, and that

no alteration in his physico-mental structure was effected by the co-partnery.

As the law contemplated the Son to be a Saviour, the language was altered to anticipate centuries to come, when man should be brought to acknowledge the Saviour to be his God.

Man was made of the elements of common matter, with his atoms differently arranged; and from a knowledge of the principle of the general law, the first consideration that seems to have presented itself to these Sovereigns of the universe in laying the foundation of the world, was to establish a law of *universal causation*, whose creative and reproductive energies would reduce to a system all the mutual relations and dependencies of mind and matter, with the expression of acts in a general formula, that would furnish a plan, or evidence of design to accomplish in a series of ages the general good of the whole: a law that would from the beginning introduce into our system new facts, and by persisting combinations, form new series of facts, in the un-

broken order of its changing phenomena, onward toward a receding end. In order to this, it seemed necessary to "let" in,

First,—a self-sustaining, mechanico-vital power, that would cause perpetual motion;

Secondly,—that this motion should undeviatingly generate matter; and

Thirdly,—that its triune relations should be rendered perfect by the force *increasing* in power, in proportion to the number of combinations that entered into the mass; whether it be an atom, a man, a globe or a solar system; and that this *triune* force, thus constructed, should work by *law* on a strictly mathematical basis, so that numbers, and proportions of numbers and geometrical figures, should express the relations of succession with a rigorous certainty that no change of circumstance, *but one that is provided for*, could ever defeat.

All these properties are found in a substance that has hitherto been considered exclusively a chemical agent; the great fact having been overlooked, that the first property of

oxygen gas was mechanical, and consisted in its *permanent elasticity.*

Elasticity, and permanent elasticity, is the difference betwixt a finite and an infinite power.

Ca-out-chouc is an elastic body, permanently at rest; while oxygen gas is an elastic body permanently in motion: and as its relative proportion is greater than that of all other substances in nature, it is a force fitted to the mechanism of the universe, with power to sustain its ponderous machinery in perpetual motion.

Being permanently elastic, it can never be brought to a point of rest: as permanent elasticity is a force of differing intensities in different directions, varying its strength to the force applied, whether it be moulding an atom or commanding a world.

Secondly,—oxygen generates matter by being the supporter of all combustion; generating heat, and yet itself incombustible.

These are all properties of permanent elas-

ticity. A body that is permanently elastic, *per se*, is incapable of oxydation, and therefore must needs be both incombustible and indestructible.

Thirdly,—that this mechanico-vital force increases in power in proportion to the number of its combinations, is seen where the binary combination of mineral substances produce ternary combinations in vegetable life, and where the ternary combinations of vegetable life produce the quaternary combinations of animal life, and so onwards.

PROXIMATE CAUSE OF MOTION.

Having shown that oxygen is a force of differing intensities in different directions, we come next to examine into the proximate cause of the dynamic force, which gives to all atoms of matter their perpetual momentum.

Sir Isaac Newton, with the power of his great name, has so entirely filled the world of

matter with his force of attraction, that reason is awed into silence, and science waits permission to break the limitations which his authority has assigned to it.

But the question might have been as appropriately asked in his day as in our own, whether attraction is not a derived power held in obedience to some antecedent force.

The directive *tendency* of this force to bring all masses of matter to a point of rest, would seem to have urged upon the mind of man the early necessity of searching for some other cause to account for the phenomena of motion.

The general postulate may be taken for granted, that repulsion and attraction are coexistent forces, acting in harmony with each other; for nature furnishes no example from her great storehouse, of two equal and apposite forces arising from the same cause.

It is force and resistance that sustains the mighty mechanism of the universe; but then force and resistance do not necessarily imply opposite momenta. The permanent elasticity

of oxygen gas shows it to be a force of differing intensities, operating both ways.

For the mutual attraction of the particles of matter is not incipiently attractive.

When the atoms come to be situated near each other, their action at a certain distance becomes positive, and changes from attractive to repulsive; and alternate transitions from one state to another repeatedly occur within very narrow limits. Still nearer its centre, the power exerted is invariably repulsive, augmenting in proportion to proximity; else matter would permanently collapse.

All masses of matter then, without regard to size, from the atom to the globe we occupy, have their centres invariably *repulsive;* while this repulsive or centrifugal force is equipoised by the mighty force of attraction, which binds each atom to the next in order, and holds the whole universe together. Every atom of matter, then, consists of a certain force of differing intensities in different directions, which repel particles directly as the mass, and inversely as the squares of the dis-

tance. We see then that the same law which makes a tear or a dew-drop, makes a world.

He who runs may see this; and if man had not run mad on the inductive sciences, Newton, Copernicus, Galileo, Kepler, Lagrange, Laplace, Herschel, Dalton, and Davy, might each have been saved the trouble of searching with their fathom-line a bottomless abyss.

CHAPTER IV.

MOTIVE ATTRACTION.

THE centre of all bodies being invariably repulsive, and the dynamic force in the atoms of all matter of equal magnitude being equipoised by the force of attraction, leads directly to the proof that the force exerted in matter is not attractive and repulsive, but a force that demands a new name significative of its property—namely, that of *motive attraction.*

It has been already shown that the mutual attraction of the particles of matter was not incipiently attractive, and that attraction, being the weaker power, must needs be the phenomenon of an antecedent force.

The experiments of M. Pouellet show, that whenever two bodies unite by combustion,

the supporter (oxygen) gives out positive heat. The same results follow whenever two gaseous bodies unite with each other; or whenever a gaseous unites with a solid body. oxygen gives out positive heat.

The *motive*, being the strongest power, cannot be separately shown, except it be in the division of matter whose masses are equal, as it is a law in physics that two exactly equal forces are of opposite momenta, and will repel each other. If we take a block of wood, say measuring exactly eight cubic inches, and divide it in two equal parts, and place the divided parts in contact on the surface of smooth water, they will repel each other. Then divide one of these blocks unequally, so that one shall contain half a cubic inch less than the other, and both divisions will immediately adjust themselves to their new centre of gravity. Place these blocks apart upon the surface of smooth water, and they will attract each other according to their respective masses of matter, till they come in contact, and there rest. Ships

shivered by storms at sea, are found with all their fragments gathered round the hull, like chickens nestling near the hen.

Here, in the two first experiments, we have the same force, differing only in its relations, producing alternately repulsion and attraction, without the intervention of sensible heat.

It was the equal forces of oxygen in the two blocks, in the first experiment, that forced them apart; while it was the unequal forces of oxygen, in the latter experiment, that brought them together. The unequal force is its natural state in matter, as the whole visible universe is sustained by an unequal and opposite force, only, however, as will be shown, by an accumulation of material.

The whole order of structure is regulated and limited by the fixed phenomena of this force: and from the interaction of its mutual relations results the circle of changes with which all bodies are revolving through their gaseous, fluid and solid forms.

OXYGEN THE CAUSE OF ATTRACTION.

Having shown the centre of all bodies to be invariably repulsive by reason of motive attraction, we come next to prove that the mysterious force of attraction, from the circumference towards the centre of bodies, is the continuous force of oxygen gas changing its relations.

The component parts of all matter are the gases of oxygen, hydrogen, carbon and nitrogen, of which oxygen forms so distinguished a part.

In order to explain the force of its attraction, we must measure the force of the mutual relations of oxygen with its attendant gases; and this will show which of them holds the sovereign power over the destinies of matter. The relative force in which these gases stand to each other, *apart from other matter*, is as follows: hydrogen 1, nitrogen 14, carbon 6, oxygen 16. That is, oxygen is 15 times heavier than hydrogen, nearly 3 times heavier than carbon, and as 16 is to 14 heavier than

nitrogen; oxygen being the heaviest of the gases.

Now to measure the force of their mutual attraction, we must measure the velocity with which they approach each other. The velocity with which all bodies approach each other by mutual attraction, is inversely as the quantity or masses of matter. Thus the velocity with which the lighter body approaches the heavier, is greater than that with which the heavier body approaches the lighter. In the mutual attraction of the gases, then, oxygen stands as the greatest attracting force.

Now, when we come to consider the very great disproportion of hydrogen, carbon and nitrogen to oxygen, in the masses of matter, the amount of attraction can only be measured by the amount of oxygen in all nature.

FORCE OF ATTRACTION SUSTAINED ONLY BY AN ACCUMULATION OF MATERIAL.

We have shown that the dynamic force from the centre of all bodies towards the circumference is greater than the force of attraction from the circumference towards the centre of bodies. This truth is implied in the fact of its being a continuous force in curvilinear circles. The question then rises, What power is it that holds all masses of matter together? It is conceded by all authorities that attraction is the returning force from the circumference to the centre of bodies, while a second and distinguishing feature is found in its being the *weaker power*, that can only be sustained by an accumulation of material, by which all bodies grow.* This is the true

* *Note to the Medical Student.—The returning force the weaker power.* It is the weaker power of this force in the human system that gathers and distributes the material: and when its function is well performed we attain the standard of health.

It is the disturbance of this force that constitutes the *symptoms of disease;* and when it fails in its function what changes undeviatingly follow? *Sensation* is disturbed, circulation altered, and

secret of its power; for, whenever any substance, whatever it may be, arrives at a con-

voluntary motion lessened. These phenomena are never-failing uniformities in this, their order of succession.

It is well for the patient if they stop here. If they proceed, they reach association, memory, imagination, and will; and it is fortunate for the patient if they stop here. If they proceed, they reach the reason and the judgment, and the whole man is ill. And we judge of the extent and danger of disease, not so much from the *physical signs*, as from the number of *sensations* that are *altered*, and the number of mental faculties that are disturbed or effaced.

It is not then the physiology of matter that we are to look at and drug, but the physiology of the force that presides over it, that we are to examine and adjust. Equipoise this force and its relations with matter are all well.

The drugging of this force I shall not speak of: but as it is the foundation of the mental faculties that is disturbed by it, the confiding intercourse of mind with mind is in place here. The morbid combinations of mind which disease generates is a part of disease, and at times no small part of it; and however much the drug may cover these phenomena, it is not to be left alone to struggle with their accumulation. Mind is to be met and sustained by mind; if you treat that state with grave and sober silence, you multiply the combinations of disease; if you make a fair and frank statement of your patient's case, you arrest the diseased mental process, and its combinations stop.

If you cheat him, you forfeit his confidence, ruin your standing, and hazard the life you are striving to save. At your next visit re-state the case, with its loss or gain, for he never falters when

dition of repose by perfect combination, and can accumulate no more material, then this weaker force begins to give way, and the motive force, which never ebbs, and never retrogrades, dissolves the mass, and brings it into new combinations without loss of material.

his loss is fairly stated, nor in my experience does it impair his hopes, for he sees himself in hands that calculate with accuracy the conditions on which he is to live or die, and he is contented in the trust he reposes in his physician and friend.

You are never to forget, that a wise silence may kill, when intelligent explanations may cure; and a double chance awaits the sick in the latter hands. He who feels the pulse, examines the tongue, writes his prescription, and leaves the patient with the declaration that he "can tell better to-morrow," fails to calculate the palsy he has thrown over the rallying powers of his patient.

Whatever we may think of the physiology of diseased matter, the physiology of a diseased mind stands first in logical order with the physician, and first in order with the patient, for the body is never sick that it does not extend its proportions to the mind; and as matter is the mere instrument of will, morbid apprehensions about disease may aggravate the phenomena, and multiply them beyond the reach of the drug that might otherwise have the power to cure.

If one physician surpass another in skill, it is not more owing to his drug than the manner in which he may sustain the sinking force through the painful mental trial of his experience. A mind intelligently guided will steer matter through storms of disease, when, in less observant hands, however well it may be drugged, the frail system may founder in the commonest breeze of autumn.

There will be a time then, when the attractive force of this globe will begin to give way, and the central energies of its motive power will dissolve it with liquid fire.

FORCE IN MATTER CURVILINEAR.

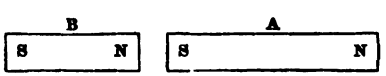
Deriving its power from a permanently elastic substance, the force exerted in matter must always be curvilinear, and can offer no examples of parallel lines. Force thus constituted, and perpetually energizing the atoms of matter, and the dynamic force from the centre of all bodies towards the circumference being greater than the force of attraction from the circumference towards the centre of bodies, must constitute all masses of matter more or less spheroidal, while at the same time it must produce and sustain a revolution of the mass of matter on its own axis.

If Professor Faraday's experiments be true, that one grain of water on four grains of zinc, will evolve electricity equal to that of a powerful thunder-storm, the dynamic force of the

earth is as adequate to perform all its revolutions, as the dynamic force of the human system is to circulate its blood.

There are some experiments to be found in the directive tendency of the magnet in Davie's "Manual of Magnetism," which exhibit the law of motive attraction in curved lines, while at the same time they prove attraction to be the weaker power.

It is known that the effects produced by the opposite poles of the magnet, are in some respects similar, and in others dissimilar. The similar force is found to be the weaker power, and exhibits the relations which attraction bears to repulsion. The similar force is the one attracting what the other repels.

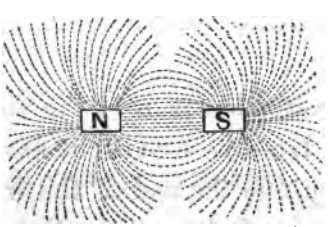


Place the iron bar A near the north pole of the magnet B;—the iron becomes magnetized by induction, and the end of the iron S nearest to the pole of the magnet N, acquires an

opposite polarity; while the opposite end of the bar—the farthest from the magnet—acquires the same polarity as the magnet itself.

First—The magnet sends its force into the iron from its north pole, and the end of the iron bar next the magnet takes an opposite polarity, and is attracted by the magnet.

Secondly—The magnetic force received by the iron bar is the same kind of force which the magnet imparted;—it is only a less force changing its relations, which caused it to be attracted towards the magnet. But the effect of motive attraction in its changing relations in matter, is rendered still more apparent by the following experiments, which prove attraction to be not only the weaker force, but that all its lines of motion are curvilinear, and never parallel.



Spread a thin covering of iron filings over a sheet of paper, and place a powerful horse-shoe magnet vertically beneath it, with the poles very near the paper;—the dotted lines in the cut will show the arrangement which the particles of iron will assume. Each one becomes a magnet with its two poles, and connects itself with those adjoining it, so as to form curves dependent on the ever varying relations of motive attraction.

"This experiment may be performed in a still more satisfactory manner, by supporting the paper with the magnet in contact with its under surface, and then showering down iron sand or filings from a sand-box held some inches above. The particles of iron, as they strike the paper, will thus more readily assume the position to which their curves tend under the magnetic influence. The lines formed by the sand afford a good experimental illustration of what are called magnetic curves; that is, the curves in which an infinite number of very minute magnetic needles, suspended

freely, would arrange themselves, if placed in all diverse positions about a magnet."

When the particles are very small, the attractive force exerted upon them by the magnet, being the difference of its action upon the two poles of each particle, is exceedingly *slight*, while the directive or motive force is very *considerable*. The curvature of the lines is due to the continued action of the two poles of the magnet.

It is this force, thus arranged, that causes the angle of arches, that forms spheroids of atoms of matter, from which our globe takes its form.

The two most important facts deducible from these experiments are—first, that motive attraction is one and the same force, of differing intensities in different directions, always producing curvilinear motion; and secondly, and not the least, that the motive force is very considerable while the attractive force is very slight, and that it is owing to the unequal force in these relations, that the directive tendency in the lines is curvilinear. We see,

then, a curvilinear force acting in all matter, from the centre towards the circumference, and returning continuously from the circumference towards the centre of bodies; which character of force pervades and actuates all its generating atoms; and as all atoms of matter grow from the centre toward the circumference, the motive is the primary force.

SENSIBLE HEAT.

When oxygen is forcibly compressed in the fire-pump, it emits both heat and light; and when its motive attraction rises above its passive state, where it is characterized by sensible heat, all nature bears its testimony to the order of succession in the phenomena of this force. A lamp-wick attracts the oil several inches below the summit of combustion. Another familiar example may be seen in contemplating the blaze of a candle with its half inch of wick: if the wick be erect, and the blaze clear, like that of a spermaceti candle, the rays radiate from it nearly at right angles

with the shaft at its base, and rise in curvilinear circles, by the force of attraction, till they meet in a conical point at the summit.

Whatever may be the amount of combustion, this force of curved lines is preserved. Whether it be the woodman burning his heaps of brush, or a forest on fire, or a volcanic eruption; the same conical summit gives form and finish to this law of motive attraction, where the atoms are repelled directly as the mass, and inversely as the squares of the distance.

OXYGEN THE CAUSE OF LIGHT.

It is shown above, that when oxygen is forcibly compressed in the fire-pump, it emits light. The highest light the eye can bear, if it have no shades, can exhibit no forms: for forms can only be seen by shadows of some kind. The painter brings into view his forms and expression only by light and shade.

Both the highest light and densest darkness

agree in this, that nothing can be seen in either of them.

Shadows are in reality the cause of forms: and all forms are explained by their agency.

The different proportions of oxygen in the different properties of matter is the cause of all light and shade, while the intermediate relations give us every variety of tint and color in nature.

THERMO-ELECTRICITY

Furnishes very finished examples of motive attraction. When one end of a wire is heated, a current starts from the opposite end, and runs directly toward the heated portion of the wire.

Thus, twisting the centre of an iron or platinum wire, and heating it on one side of the twisted portion, it will produce a current flowing at the heated part from the untwisted to the twisted portion.

A current may also be set in motion with two wires of the same metal, by heating the

end of one and bringing it in contact with the end of the other. The attractive force of the current at the junction, is from the cold to the heated wire.

There is another experiment which adds its force to these examples. A current may be produced by heating the junction of two platinum wires of different diameters. In this experiment, the current flows from the fine to the coarse wire, whether the heat be applied at the point of junction, or to either wire at a little distance from it.

These experiments may be greatly multiplied; and they are the more valuable as they are rendered in the most simple form, and with the least number of combinations. The current in these cases being conducted in its entire transmission, forward and backward, (through the fibrous structure of the same metal,) over its constant disposition to become passive, can be attributed to nothing else than the force of motive attraction.

The experiments themselves are unequivocal statements of facts, and place the cause

and effects of this force clearly before the mind; namely, that there is one and the same force, of differing intensities, running in alternate currents—the one centrifugal and the other centripetal—at the same instant of time in the same wire, and the force thus exhibited is the law of universal causation.

CHAPTER V.

MATTER.

HAVING shown motive attraction in its differing intensities to be the Law of Causation, we come next to trace its results in its combinations with matter. We have for ages been reasoning of physical, vital, moral and mental laws, as if they had a separate origin; and deductions have been drawn from them with a familiarity that betokened an intimate acquaintance with their formulæ, when the first ray of light had yet to dawn upon the economy and structure of the law that governs their manifestations. Our immediate business in this lesson is, first, to ascertain what materials man is made of, and then learn how the law puts them together; so that his

sensation, circulation and voluntary motion, will rise in succession out of the multiplying combinations of matter.

If we begin as we always have begun, with the study of our vital structure, made up and finished as it is; if we thus isolate man and cut him off from his antecedent relations to matter, we lose sight of his causation by leaping into the midst of his complex combinations, unmindful of the simple elements that led to his primitive structure.

It is much easier to begin our investigations with his rudimental atom, than to unwind the thread of his mechanism backward to his birth. We are to remember, too, that we are candidates for eternity, starting from the very lowest beginning; otherwise there would be a blank in our existence which we should be for ever struggling to fill up, requiring some antedate to satisfy us of our origin.

It is the wonders of inorganic matter, that foreshadow to us the strange development of our origin and growth; and we are to trace out the successive steps of our physico-

moral and mental structure, from one and the same cause, that forms, unfolds, and sustains all other *matter*, whether the matter be organic or inorganic. If it be shown that this one law—and one only—forms and sustains the ponderous mechanism of the universe, and all its animate existences, with an undeviating regularity and precision, then the problem of any one link in the chain of causation being solved, must needs furnish a solution of the whole. Man, though a complex problem by reason of his higher combinations, constitutes but one link in the chain of causation, and like all other complex systems has his beginning in simple combinations, designated by the law of numbers.

The law of numbers is identified with the law of life, and multiplies in endless combinations; and yet it gives us all its changing results in the figure 2. Its relations to 1 and 3 efface its unity, and resolve it into a compound, whose parts are degrees and its degrees are deviations. The degrees themselves being the difference, the difference is always

changing, and therefore, instead of being a *fixed truth*, it comes to be a movable force of changing relations operating both ways; and hence the problem of the figure 2, simple as it first appears to be, presents difficulties of no less magnitude than that of man. If we could but trace the relations of this digit with 1 and 3, it would at once unravel the secrecies of him who ordained the law and set man to work out the problem of its solution. But no number whatever can be isolated—they all stand in an imperishable and universal connection with their antecedent and successive relations, and are dependent on these relations for their individuality.

In its twofold relations to 1 and 3, the figure 2 is a complete and full exemplification of any one link in the great chain of causation, as it is a link of universal and unbroken connection. In its relations with 1 and 3 it has neither beginning, middle nor end, and its range is illimitable in both directions, as we can never reach the subdivisions of the number 1, nor exhaust the accumulations of the figure 3.

The nature of the force of numbers, then, lessens by subdivision in one direction, and accumulates in the other without end, constituting a force of differing intensities in different directions, exactly parallel with the Law of Causation—and like it, every change in numbers, whether by increase or diminution, brings out a new combination to the end of time.

It is at first difficult for the mind to conceive the illimitable range of any single number, or that parts of the digit 2 form an aggregate of the remotest calculations in algebra. "Whatever is made up of parts, is made up of parts of those parts." "This truth, obvious to the senses in all cases which can be fairly referred to their decision, and so general as to be coextensive with nature itself, being true of all sorts of phenomena, (for all admit of being numbered,) must be considered a truth or law of nature of the highest order." Every arithmetical operation is an application of this law, which is our warrant for *all* calculations.

While the modes of formation of any one

number are innumerable, when limiting the parts to two, the number may be formed, and consequently may be divided, into as many different ways as there are numbers smaller than itself, and if we admit of threes or fours, in a still greater variety.

The aggregate which we call *four* has a still greater number of characteristic formations.

Innumerable as are the true propositions which can be formed concerning individual numbers, no adequate conception can be gained from these alone of the extent of the truths composing the science of numbers, as it is coextensive with all nature.

The properties of the number 4 are true of all objects that are divisible into four equal parts, and all objects are either actually or ideally so divisible. But the propositions which compose the science of algebra are true; not of any particular number, but of all numbers: not of all things under the condition of being divided in a particular way, but of all things under the condition of being

divided in *any* way—of being designated by a number at all. The simple combination of oxygen and hydrogen forms rain water, which, in its natural state, deposits albumen, and it is idle to maintain that this albumen is a deposit of animalcula, when albumen is found to be a constituent property of mineral bodies and an apparent property of vegetable substances.

Now, as no thing that we know of has a beginning, middle, nor end, there is a difficulty in knowing where to begin with the investigation of matter. All causes, to our apprehension, are but effects of antecedent causes, and hence our beginning cause must be assumed; supposing, whatever may be its antecedent, *it* produced it.

It is assumed, then, that oxygen is a generant hypothesis, with the triune relations already stated; the three relations in the hypothesis being essential to the ultimate truth, that man was made in the image of his Maker. Its first property, that of permanent elasticity, producing perpetual motion, is already before the

reader. Its second property, that of the perpetual generation of matter, comes next in order for consideration, and we begin with the oxyde of hydrogen when oxygen generates water, I now have three ounce vials of pure rain water, caught while falling from the clouds in January (a season that generates few animalcules), well filtered through paper and well corked, that have been standing three weeks, in a temperature of about 85 Faht., each having a deposit of albumen at the bottom.

Knowing that at least one half of my readers will be ready to say that this albuminous deposit is the product of animalcula, and as I cannot argue the question here, I will leave it, to prove when I again recur to it, that albumen is one of the elements of matter, and must needs be one of its products. It will not be denied that calcareous dust is one of the products of water in its natural state; and it will be safe to introduce the reader to the single declaration narrated in the first chapter of Genesis, that man was made of

dust. If we begin here, and follow out strictly the order in the succession of his development from this low beginning, it will exhibit the whole law of his causation.

CHAPTER VI.

ALL MATTER VITAL.

THE elements of dust are the elements of life; for there is no substance, however inert or passive its atoms may be, whose combinations are not governed by a force common to all vital structures. The very debris of the soul that lies mouldering in the grave, moved only by the worm, has generated the force that moves it, and testifies that all matter is vital, and ever ready to animate all other atoms with which it comes in contact, with a higher degree of life. Death is but a comparative term,—in a world where there is *nothing fixed but change*, death has no reality.

Names have a mighty influence to lead the mind from important truths into dangerous

error. The resurrection of life, however plainly it may be taught in the Bible, is to receive its demonstration only in the law of matter.

DIFFERENCE OF STRUCTURE IN ALL MATTER.

But there is a difference of structure in all matter which is made by the same law:—the difference, as we shall presently see, consists in the intensity of force, resulting as the combinations multiply from the mineral up to man.

The matter which composes organic bodies consists of precisely the same materials as that of inorganic matter, differing only in the number and intensity of its combinations.

The proximate elements peculiar to animal life, are fibrin, albumen and gelatin:—these are found to be the elements of our own framework, and chemical analysis reduces them all to the same simple elements which constitute mineral bodies. Seventeen mineral substances, or twenty, are found in vegetables, and fifteen in animals and man.

All these substances more or less commingle, and each is promiscuously found both in vegetable and animal life, as well as in mineral bodies. Chemical analysis reduces these bodies still further into oxygen, nitrogen, carbon and hydrogen, the primitive elements of inorganic matter; which brings them into dust, the starting point of man.

THEIR MODE OF COMBINATION.

Without entering here into the mutual relations which these gases bear to each other, we may make the general statement that their combinations are as illimitable and coextensive as that of matter, and that in every new combination they acquire an accessional force, which forms new atoms of matter, according to a general law, in which each atom bears a certain and fixed relation to its antecedent atom; so that the force in one atom causes the growth of the next in order, whatever it may be. Leaping over the succession in the atoms of matter which make man out

of dust, we are conducted with equal certainty to a clear conception of his successive formation, by observing the forces as they combine by the law of causation to make mineral, vegetable, and animal life. Having one common basis, the difference betwixt mineral and vegetable life, and betwixt vegetable and animal life, consists in the relative proportions which these several gases of oxygen, nitrogen, carbon, and hydrogen bear to each other in the different bodies by combination. The order in which they unite to make each other, and finally to make man, is the following:— Minerals, which form the basis of vegetable structure, are formed by one combination of these elements, vegetables by another, animals by another, and man, the highest attainment, by another.

Minerals and vegetables unite by the simplest and lowest form of combination. In reaching up to animal life the combination proceeds in arithmetical progression, while in man the combinations run into fractional relations, which introduces mental physiology.

In mineral substances these elements unite in a binary manner. First, two elementary substances unite together, and this binary compound unites again with another substance, or with another binary compound, and this law of combining by two and two makes all the different minerals that are known.

In vegetable substances these elements unite by another and higher change in the law, and are called ternary or quaternary, according to the number of elements composing them.

The ternary holds a lower relation to mineral substances, while the quaternary stands in higher connection with animal life. Vegetable mucus, starch, and fatty matter, are ternary compounds of oxygen, carbon, and nitrogen; while gum resin, animal mucus, albumen, and fibrin, are quaternary compounds, and their fourth ingredient is hydrogen.

So that vegetable substances of quaternary compounds hold properties in common with animal life, and may justly be termed vegeto-animal matter.

In animals these elements combine differently; three or four unite together so as to form a compound, in which each element is equally united with all the others.

Oxygen, hydrogen, carbon, and nitrogen, the same elements which by binary combination produced minerals, and by ternary and quaternary combinations produced vegetables, unite together, each with all the others, and form the proximate principle of animal life.* Rising from quaternary combinations into arithmetical progression, sensation is produced and gives all the variety of animal structure, from the star-fish, whose substance is composed entirely of mucus, to that of the elephant, whose physico-mental structure may be regarded as the summit of animal attainment.

much has been written, and so much is known of the generation of heat by oxygen, that I have hitherto felt it to be unnecessary to allude to it, supposing the reader to know as much about it as I do; but it is necessary to call attention to the degree of heat that oxygen is generating, where quaternary compounds rise into arithmetical progression, as the degree of heat at that point produces animal sensation.

The honor of discovering the essential distinction peculiar to the organic structure of man belongs to Berzelius. He found that in such organic products the combining proportions do not, as in other organic products, observe a simple arithmetical ratio, but differ by fractional proportions of their atoms, according to a general law. In animal tissues, the elements are not united by the simple ratio of one to another, as one atom of 1, 2 or 3 or 4 of another, as in mineral and vegetable bodies; but several, as 10 to 12 of one are united with several of each of the others, to form one compound atom.

CHAPTER VII.

OF WATER—OXIDE OF HYDROGEN, H. O.

HAVING now shown that albumen is an element of matter; that all matter is vital by means of its mechanico-vital force; that the degree of force in each system of relations of mineral, vegetable, and animal life, rises from binary combinations into arithmetical progression, from which fractional relations spring, that gives the force of the human system; I return to the oxide of hydrogen, where oxygen generates that substance called water. In Kane's Chemistry, edited by that distinguished Professor, John William Draper, is found the following significant remarks upon water:—

"The exact determination of the composi-

tion of water is one of the most important investigations in the domain of chemistry, as from the great range of affinities which oxygen and hydrogen exercise, and the variety of compounds into which they respectively enter, the numbers adopted for the combining proportions of almost all other bodies, *hinge* upon those which are employed for the constituents of water."

If Dr. Draper had driven a spike where he hung his hinge, he would have fixed the wavering science of chemistry for his successors.

Now chemistry is a mere mess of pottage, that clings to attraction for the element of its matter, reposing on repulsion as one of its properties.

It has exhausted the vocabulary of awkward words to give names to its kettle full of laws, that have no starting point. Always swimming in water with the full knowledge that eight-ninths of its weight was oxygen, the science has not yet reached the obvious fact, that the rate of motion in all bodies is proportioned

to the quantity of water they respectively contain. Jonah's gourd grew up to be a tree in a single night, its chief ingredient being water.

Farmers have discovered by observation, that when grass first rises through the crust of the earth, it grows very rapidly, and contains so much water, that it injures their cattle, the amount of solid matter being comparatively small. As it rises higher, its growth is slower and slower, in proportion to the deposition of a more solid form of carbon; the sugar and soluble matter first increasing, and then decreasing, to give way to the deposition of woody fibre.

Three-fourths of the whole terraqueous globe is water, and four-fifths of the animal tissues by weight is water; and the rate of motion in each will be found to stand in the ratio of three-fourths to four-fifths of the circulating or revolutionary force.

If there is any place in the great law of universal causation where there is no water, *there* reigns eternal death.

CHAPTER VIII.

FORCE.

ALL force, as it rises from power, is first passive and then active. Our muscles of locomotion receive their momenta from the nervous power at rest, while our planet, wheeling on its axis day and night in eternal succession, at the rate of seventeen miles per minute, holds its atoms in repose: and yet it is in the dynamic force of motive attraction in its generating atoms, from which the general mass receives the momentum of its perpetual revolutions.

The mighty heaving undulations of the ocean, are no more than the dancing of the surface water on an elastic base in a condition of repose; and the rise and fall of the tides is

but the action and reaction of a permanently elastic body, which would be exactly equal in opposite directions, but for the pressure of the atmosphere that hurries the falling, and equally retards the rising tide, making an hour's difference in its regular return.*

Matter, apart from its force, has no existence; it is force that makes it, force that decomposes it, force that brings it into every new form and combination and mode of action, of which matter is susceptible. As all solids are made up of fluids, it is quite certain that water was the first product of the Law of Causation;† and as the rate of motion in all bodies is proportioned to the quantity of water they respectively contain, we are to look to the fluids of the human tissues for the force that constitutes organic life in all its phases, from the animalcule up to man.

The blood which is derived from our ali-

* Ocean currents are to be explained by the same law as that of the circulation of the blood.

† "When the earth was without form and void, darkness covered the face of the *deep*."

ments, converted into the fluid called chyle, holds in itself the grand elements of this force, through which the functions of life are maintained.

First, oxygen, by which the oxydation is carried on; and secondly, the nutriment or new materials (four-fifths of which is water) for repairing the waste of the living structures.

The combustion of oxygen, in the body and out of the body, is governed by the same law.

The body is burned, consumed, wasted, and transformed by oxygen, precisely as any other ignited substance, and parts with its heat to surrounding matter as that of any other heated mass. The oxygen, in both cases, combines with the carbon and hydrogen; in both cases, the same product is given out, namely, heat, carbonic acid, and the vapor of water.

Water taken in at the temperature of 40 degrees passes off at the temperature of 96. The generation of animal heat, then, must be rapid in proportion to the loss, and this causes

the rapid transmutation of the tissues by oxydation. So that life is a flame, the body its furnace, the aliments its fuel, and the water taken into the stomach supplies the oxygen that generates the animal heat; the process of respiration having no part or lot in this matter.

The pulmonary cavity is but the smoke-pipe of the human system, made to carry off the carbonic acid gas, with a portion of animal heat, by exhalation.

OXYGEN THE SUPPORTER OF ALL COMBUSTION, AND YET INCOMBUSTIBLE.

I have now arrived at a point where it becomes necessary to notice another of the great properties of this substance, namely, that it is the supporter of all combustion, and yet incombustible; properties that would seem to confer on it the power of the right hand of Omnipotence, always giving without loss, for ever supplying without diminution.

When we look to the field of its exercise,

and the dominion of its power over all matter; and see combustion to be the active state of the passive changes, that are incessantly going forward in the succession of all phenomena amongst the atoms of matter, in all worlds, we discern the cause as well as the necessity of this imperishable endowment.

The attraction of oxygen for combustibles, is owing to their being in different states of caloric, produced by different proportions of this substance, which causes a perpetual combustion throughout nature, without loss of material.

Secondly—That which supports combustion, supports alike all the passive changes that matter is perpetually undergoing in the successive changes of its phenomena; and the tendency of oxygen to combine with its own properties, in different states, causes all the various combinations, decompositions and changes in organic and inorganic matter.

Thirdly—The process of decomposition by combustion, is the same in all examples of it, differing only in the degree of its intensity evolving more or less heat.

SENSATIONAL PHYSIOLOGY.

CHAPTER IX.

SENSATIONAL PHYSIOLOGY.

SENSATIONAL physiology comprehends that system of relations that constitute animal life in all its phases, from the *mold* up through the cold-blooded race to the oxydizing dog or elephant, one or the other of which may be the summit of animal attainment.

The combinations of mineral and vegetable life being fully stated, we now come to that deeply interesting part of the subject where "life connects itself with matter:" or in my understanding of it, where the combining proportions first develope *sensation.*

We have stated the force of combination in all masses of matter to be in the ratio of the quantity of water that enters into the com-

position of its structure, and that four-fifths by weight of the animal tissues is water.

The difference also betwixt the rates of motion in inorganic matter and that of the animal tissues, has been stated in round numbers nearly as three-fourths of the former to four-fifths of the latter; which is in exact agreement with the difference betwixt simple combinations and that of arithmetical progression.

The circulating force in animal tissues surpassing the revolving force in matter, will be found to be in that ratio. We have now to state, that unless the animal tissues hold four-fifths by weight of water in their composition, they do not generate animal heat, and are totally unsusceptible of sensation.

As four-fifths rises from quaternary combinations into arithmetical progression, we have arrived exactly at the point where the animalcule in its simplest form of combination is first developed; which introduces the vexed question of

SPONTANEOUS ORGANIZATION.

About this question, both philosophers and men of science are nearly equally divided. The Law of Causation is arbitrary only in one particular, namely, that while it allows the playful pencillings of infinite variety, in all its pictures, it admits of no indolent obedience to its law.

The point where scientific men differ and separate, is at the phenomenal relations that subsist between vegetable and animal life, where sensation first manifests its connection with matter—some denying the relation while others maintain it; and no experiments have hitherto tended to settle the controversy.

If we examine the animalcule, in its place, in the Law of Causation, *that* is, in the order of its antecedent and successive relations, it will be found just where the law is changing from simple combinations to that of arithmetical progression, and holding a feeble proportion of four-fifths of water in its tissues.

The simplest combination of animal life where sensation first manifests itself in matter, is found in mines, where, "unmolested by winds, or changing temperature, the *infusoria* or *mold* covers the damp wall." The proper element of this infusoria, or mold, is albumen, which it receives from the mineral body to which it adheres; the mineral being the matrix of the mold. Its delicate tissue is composed chiefly of water, eighty-five per cent. of which is oxygen; it has a feeble circulation, with little or no sensation.

Sensation and circulation stop here with the mold that is derived from mineral bodies, and go forward with accessional force through the agency of fibrin, in vegetable mucus, which is a ternary compound of oxygen, hydrogen and carbon; and when sensible heat is brought to act upon fibrin in vegetable matter, animalcules are generated higher in the scale of being, with another faculty, that of *voluntary motion*, of which the mould is deprived. *Sensation, circulation, and voluntary motion* are the second simplest combination of sensation with matter.

Nature performs her experiments for us on a grand scale, which we cannot imitate in miniature. There is no division of opinion about these countless tribes of atomic life, springing from and accompanying the presence of sensible heat, while its absence is always attended by the extinction of life. The collision of opinion arises from the *manner* and *cause* of the production. Now it is equally known to both parties, that chemical experiments have decided that the element or germ of animalcules is found as a constituent property, not only of vegetable, but as far back as that of mineral bodies. Fibrin, albumen, and gelatin—the elements which compose our own bodies—are properties and constituent principles of mineral substances.

The discovery that there is no hybridity, adds its testimony to the law of the production of animalcules from the action of sensible heat in its own proper element. Experiments have rendered it certain, that *hybridity* in animals results from the *absence* of a proper degree of sensible heat. "The mule that has

hitherto been regarded as a hybrid, is so only from accidental circumstances. Prevost and Dumas, in repeating the experiments of Lewenhoeck, have discovered the hybridity of mules in northern climates to be caused by the absence of spermatic animalcules; while these being present in the mules of hot climates, explain the phenomena of reproduction."

In this example the law defines its degrees so clearly, as to give us all the particulars—namely, that in northern climates sensation is unfelt in the spermatic vessels by the hybrid, and reproduction is impossible; whereas a hot climate, in establishing the necessary degree of heat, produces the necessary supply of circulating fluid, whereby sensation in the spermatic vessels of the hybrid is developed, and the animal resumes its place in the law of causation, by becoming reproductive. Thus I have bridged over the chasm that has hitherto been leaped, and connected mineral, vegetable, and animal life by the chain of causation.

From quaternary compounds, the law rises in arithmetical progression, and leaving the simpler combinations that form animalculæ, enters upon the generating force, which constitutes the *sensational physiology of animals higher in the scale of being*, with *attributes* proportioned to the number of combinations that enter into their composition.

CHAPTER X.

SENSATIONAL ATTRIBUTES.

ANIMAL physiology is limited to a sensatio-physical force, as all their *attributes* are derived immediately from sensation, and are what may properly be termed *feeling* attributes.

The elements that compose the structure of animalculæ limit their attributes to *voluntary* motion; while the elements that compose the structure of the higher animal, such as the dog, extend their sensational attributes to the will also, but with this difference, that association, memory, and imagination are intervening attributes. *Sensation*, *consciousness*, *association*, *memory*, *imagination* and *will*, constitute his sensational attributes.

No animal, not even the dog, has the sense of touch, to enable it to distinguish properties *in bodies;* this sense in the animal, being a *sensation*, and not a *perception*, enables it only to distinguish the *outward* properties of matter.

Sensation, then, in the animal adjusts but four perceptions to open its intercourse with the external world—namely, sight, hearing, smell, and taste. This limitation in his perceptions limits his endowments to the order in which he moves. The following experiment will exhibit the order in which the sensational attributes of an English cocking spaniel (a bird dog) determines his will. Take the gun from its case in his presence, and walk toward the door; he immediately barks, jumps and springs in circles, till he learns the direction of the sportsman, and if toward the field, he runs thither with increasing animation, occasionally turning back with a whine to beseech the sportsman to hasten his steps.

The gun has roused his *sensation;* his *consciousness* of sensation corresponds with it; he

associates the gun with the *memory* of past sport; his *imagination* leads him to the field, and he *wills* to enjoy it. Sensation and the consciousness of it are so intimately blended, that I regard consciousness as sensation rising through all the attributes, as their common bond of union, and the four attributes of sight, smell, taste, and hearing, determine the disposition and will of the animal.

CHAPTER XI.

SENSATIONAL PHYSIOLOGY OF MAN.

THE difference betwixt the physical force of animals and man was found to consist in this—that the former proceeded in arithmetical progression, while the latter extended into fractional relations. Man then, in the rising order of his successional development, comes to be a *sensatio-physical mental force.* His nature reposes in these *three* relations, bound to each other by the order in their succession. That we may comprehend him, as a whole, and as he is, he must be contemplated in this order. Any system of menta. physiology, or of our mental or moral nature, not founded in the order of these relations, must necessarily fail in its object, and can

never lead to any satisfactory illustration of our moral nature, or to any practical improvement in the economy of thinking.

The human mind, abstractly considered, can never be comprehended, as it is not cognizable to our senses. It is only when the mind, by the higher ground of law, works itself out into its material relations, that it comes within our grasp, when it can be touched, handled, and understood. Being the proximate cause of matter, it imparts to it all its animation and spirit, watches over all its contingencies, shares all its dangers, and assumes all its responsibilities.

ORDER OF SUCCESSION.

If fibrin be the product of albumen, an atom of albumen is the starting point of man.

This substance in its lower arithmetical relations with animal tissue, produced sensation, circulation, and voluntary motion in the *infusoria*, while in its higher arithmetical relations, it evolved all the attributes of sensation in the dog, namely, *association*, *memory*, *imagination*, and *will*.

Sensation is now found at the summit of its fractional relations with the matter of this lower world, and is to unfold the whole phenomena of our sensatio-physical-mental force.

Four-fifths of this atom of albumen is water, eighty-five per cent. of which is oxygen, that gives to its motive attraction the highest rate of motion, and the atomic circulation of water, (the antecedent of red blood,) is already performing its alternate transitions, the first specific and productive exercise of which is fibrin.

Now sensation presupposes nervous matter to have been generated by the triune relations of motive attraction, exactly at the point where its combinations begin to generate animal heat; so that we now have a circulation with nervous matter, sensation, albumen and fibrin, as the foundation structure of man.

Here we must pause for a moment, before we enter upon ground that has been the scene of so much strife and collision of thought, as that of the first organ of formation in organic life. And I am reluctantly led

to the conclusion that it must be the stomach, —I say reluctantly, because it has been strenuously maintained in the face of all opposition, by one of the most celebrated and successful quacks of the age, that this organ was the primal one; and on which opinion he asserts that the success of his practice chiefly depended.

The proofs, however, are too clear to be denied. If it should turn out as we foresee it will, that the lungs are *excreting organs* and do not generate animal heat, we have a circulation already without a heart, in full preparation to make one. Whatever organ begins the order of succession, sensation is now its generating force; and as the structure spreads from the centre toward the circumference, sensational phenomena fill every space with their attributes, and crowd on the threshold of every new deposit.

Now if we affirm that no vital structure can be formed in opposition to the law by which it is afterwards sustained,—or in other words, that the forming law is the sustaining power—

the stomach must stand as the first organ of formation in its logical order, as it generates heat for all other organs, and they derive support from it. Thermometrical experiments confirm this opinion. If one thermometer be put into the stomach, and another in the blood, the first will range steadily from one-half to three-fourths of a degree higher than the second, and maintain that ascendency.* So that whatever amount of vital heat be expended by the general system, as long as life remains the stomach will hold a source of supply. This opinion also gains support from the fact that every other organ has been found malformed or wanting except this one, no example of which has yet been recorded. But there is an experiment recorded by Sir Wilson Philip, on the stomach, very decisive and significant in its character, and one that seems to determine the order of its succession. In dividing the gastric nerves of a rabbit, he found the digestive process stop, while the

* See Beaumont's Experiments.

secretion of gastric juice went forward undiminished. In attempting to restore it by galvanism he partially succeeded. As his mind was searching for the identity of the galvanic fluid and the nervous power, he failed to draw the most obvious and profitable conclusion from his experiment: namely, that in the section of the nerve, he had only separated the attractive from the motive power, which latter force went on in the performance of its function—generating heat and gastric juice, minus the solvent power.

Now if we take a retrospective survey of the succession in phenomena as predicated of this atom of matter, we have first *nervous matter*, then *sensation*, and following in its train, *albumen*, *fibrin* and *stomach*.

But in tracing these relations we must not be unmindful of other co-existing forces radiating from the centre toward the circumference: for the human frame has wrapped within its sensatio-physical-mental force, three several systems of relation, while each of these systems of relation is perfect in itself:

being all co-existent forces, and spreading out their sensational phenomena through each of these several systems at the same instant of time.

The nervous power primarily evolves all these several systems by means of its motive attraction, and we shall state them in the following order:—

First, the *digestive;* secondly, the *muscular;* and thirdly, the *osseous* systems, which fit the future animal structure for nutrition and locomotion.

Secondly, the *gastro pulmonary* and *lymphatic* systems of circulation. Each of these systems of circulation is perfect in itself.

Lastly, the nervous system penetrates and is the platform for these different systems of relation. The first nervous system of relations begins with the gastric, and terminates with the medulla spinalis; the second system begins with the medulla spinalis, and ends with the reflective substance called the medulla oblongata; while the third and final summit of its action terminates with the brain. Each of these systems of relation differ both

in structure and function, and is perfect in itself.

The first series in these relations, namely, the *digestive*, *muscular*, and *bony* systems, being merely the sources of nutrition and locomotion, demand from us here only a passing notice of the order in their succession.

But the nervous power primarily evolves all these several systems of relation by means of its motive attraction, radiating from the *solar circle*,* that *sun* and *centre* of the nervous system, whose three times three relations have multiplied from the triune relations of the gastric, the first deposit of the vital force. This brilliant centre radiates *nine plexuses* of nerves, having nine different susceptibilities, that spread their different sensations throughout the framework (minus the brain), carrying out, through the medium of the external perceptions, the feelings, affections, and emotions, and bringing back, through the same channel, the impressions derived from the external world. One of these nine plexuses

* See plate in front.

that start from the *solar centre* follows and penetrates the whole second series of relations, namely, the gastro-pulmonary and lymphatic systems of circulation; and by its momentum or motive attraction impels and sustains these three several systems of circulation.

CAUSE OF THE CIRCULATION OF THE BLOOD.

The popular theory of respiration separates the oxygen from the nitrogen, when the oxygen unites with the blood in the general circulation, and a chemical union of the carbon and oxygen is effected, by which the carbonic acid gas is expelled from the system through the lungs and skin; and through the agency of oxygen thus supplied animal heat is generated, which causes the circulation of the blood. My understanding of the process of respiration leads me to believe the one above stated to have been the treacherous guide-board that has always pointed out the wrong way; and it comes at once to be necessary to efface the

hand that has hitherto so successfully misled the votaries of science; for it is the right understanding of the generation of animal heat, that must unfold the great problem of organic life.

There is but one true theory of respiration, and that is where the carbon is converted into carbonic acid gas in the lungs, by its union with the inspired oxygen; and the discharge of carbon in this process leaves the blood red, without one atom of oxygen being absorbed, or one degree of heat being added to the blood: the heated breath, on the contrary, shows respiration to be a cooling process.

The thermometrical experiments already stated, prove the generation of animal heat to range higher in the stomach than in the blood that is returning from the lungs. This fact, *per se*, would seem to render the question of the generation of animal heat no longer debateable.

But, secondly, the rudimental circulation begins with the fœtus in utero, as well as with

the full grown man, in the stomach and duodenum; is driven and not drawn through the open channels of what is inappropriately called absorbents, into the receptaculum chili. This receptacle is situated at the second lumbar vertebræ, and from thence the chyle is driven up perpendicularly against the attraction of gravitation, through the thoracic duct, to the sixth cervical vertebræ of the neck, when it empties itself into the left subclavian vein, is driven through this vein into the left side of the heart; then it is driven by the heart through the pulmonary arteries into the lungs, when it parts with its carbon by its union with the oxygen of the inspired air.

Now the most remarkable fact in this circulation is next to be stated—namely, that it begun its circulation without a heart, unaided by the vessels through which it was driven, and completed three-fourths of this series before it reached the heart—and nearly four-fifths of its course before it reached the lungs, while at the same time it is generating more heat by the thermometer than any other portion of the general circulation.

The fact that the new blood when it blends with the old in the subclavian vein, is charged with more effete properties than the old blood with which it mingles, must strike every observer; and must necessarily undergo more rapid oxydation, and generate more animal heat.

But, secondly, apart from the consideration of the circulating force, the channels through which it is driven deserve consideration.

First, an absorbent is an open channel;—if it absorbs, when does absorption end, and the driving force begin? How came the absorbent there? Are not all solids made of fluids? and is not this fluid the antecedent force that made the *absorbent* for its own conveyance into the receptáculum chili?

When we reach the thoracic duct, we are surprised to find this vessel, with its coats so delicate and thin, that it is difficult to trace it. This vessel, too, was made by the fluid it circulates, and it is but the passive instrument of the fluid it is designed to convey.

The supposition hitherto entertained, that attraction was the elemental force in matter, has wrapped in its folds the circulation of the blood, and concealed from us the true cause of its motion.

The blood is not drawn but driven by the combination of its atoms, in the process of oxydation, producing a rapid transmutation of this fluid. And as all forces are first passive, by reason of simple combinations, and then active, as the combinations multiply, the reader has before him the whole successive phenomena of the circulation of the blood, which introduces its

ALGEBRAICAL LAW.

The Algebraical law that governs these several systems of circulation, is introduced here chiefly with a view to impress upon the reader's mind the nature of the *changes* in the law, by which its *cumulative* power is shown in the accessional force that is gained by every change in the law, as the combinations multiply.

The force of the circulation being given, we greatly err, if we suppose the knowledge of its primal impulse would enable us to comprehend it; for the pulmonary, apart from the gastric circulation, is a complete system of relation within itself; and the force being given, our calculations would terminate with the centrifugal impulse, while the returning or centripetal force is sustained by a change in the combinations of the law, by which it gains accessional power with no alteration in its primitive adjustment.

Deprived of the knowledge of this change in the law by combination, the circulation of either system of red blood must for ever remain a mystery.

And here I beg leave to acknowledge my obligations to Mr. Charles Babbage, for the aid derived from his "Calculating Engine," (see ninth Bridgewater Treatise, to which the reader is referred at large,) and I here extract such parts of it, as have an immediate bearing on the Algebraical law of the circulation of the blood.

Mr. Babbage first constructed what he considered a "Difference Engine," which in a note received from him, he says he has embodied into an analytical engine, with a compact and comprehensive language adapted to it, called the *Mechanical Notation*, by which every successive movement in the machine becomes known.

The object of this analytical engine is to convert into numbers all the formulæ of analysis, and to work out the algebraical succession of all formulæ whose laws are known.

He says of the Engine, "that it is true to the vast induction of one hundred million and one; but after that, the next number presented by the rim of the wheel, instead of being one hundred million and two, was one hundred million ten thousand and two, the whole series from the commencement being thus :—

1
2
3
4
5
. . .

. . .
. . . . .
. . . . .
99,999,999
100,000,000
regularly as far as 100,000,001
100,010,002 :—the law changes.
100,030,003
100,060,004
100,000,005
100,150,006
100,210,007
100,280,008
100,360,009
100,450,010
100,550,011

The law which *seemed* at first to govern this series, fails at one hundred million, and the second term is larger than was expected by 10,000. The next term is larger than was anticipated by 30,000, and the excess of each term above what we had expected, forms the following table :—

10,000
30,000
60,000
100,000
150,000
. . . . . .
. . . . . .

being, in fact, the series of *triangular numbers*, each multiplied by 10,000.

$$1+2=3$$
$$1+2+3=6$$
$$1+2+3+4=10, \text{ \&c.}$$

The numbers 1, 3, 6, 10, 15, 21, 28, &c., are formed by adding the successive terms of the series of natural numbers, thus,

$$1=1$$

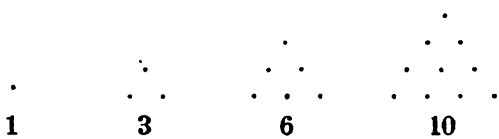
"If we still continue to observe the numbers presented by the wheel, we shall find that for a hundred or even for a thousand terms, they continue to follow the new law relating to triangular numbers; but after watching them for 2761 terms, we find that *this* law fails in the case of the 2762d term.

"If we continue to observe, we shall discover another law then coming into action, which also is dependent, but in a different manner, on triangular numbers.

"This will continue through about 1430 terms, when a new law is again introduced which extends over about 950 terms; and this too, like all its predecessors, fails, and gives

place to other laws which appear at different intervals.

"They are called triangular numbers, because a number of points corresponding to any term can always be placed in the form of a triangle, for instance :—



"Now it must be remarked, that the law *that each number presented by the engine is greater by unity than the preceding number*, which law the observer had deduced from an *induction of a hundred million instances*, was not the true law that regulated its action, and that the occurrence of the number 100,010,002 at the 100,000,002 term was *a necessary consequence* of the original adjustment, and might have been as fully foreknown at the commencement as was the regular succession of any one of the intermediate numbers to its immediate antecedent. The same remark ap-

plies to the next *apparent* deviation from the new law, which was founded on an induction of 2761 terms, and to all the succeeding laws; with this limitation only—that whilst their consecutive introduction at various definite intervals is a necessary consequence of the mechanical structure of the engine, our knowledge of analysis does not yet enable us to predict the periods at which the more distant laws will be introduced."

The whole of this extract furnishes a lucid and comprehensive statement of endless succession in the law of causation, exhibiting very clearly its cumulative power, by which it gains accessional force by combination in every change in the law. But there are some statements upon which the reader will put a different construction from the one which the *great inventor* himself seems to have drawn; especially in the last sentence of the extract, where he says "that the consecutive introduction of the laws at various definite intervals is a necessary consequence of the mechanical structure of the engine." Now it

seems to me "that the mechanical structure of the engine" ought not to be the *cause*, but the *consequence* of "the consecutive introduction of these laws at various intervals;" that its mechanical force should be so adjusted as to change with the changing law; otherwise the engine *makes* the law, instead of *explaining* it. There is another point, too, in which his language cannot be misconstrued.

In almost every change in the law, Mr. Babbage speaks of the old law failing, and another law coming into force; when it can be no other than the one law changing its relations by combination. The accessional force of the changing law is gained, not by the failing, but by the cumulative force of its antecedent relations.

The engine plainly represents the law, as far as it runs smoothly, in the order of its succession; but then, if I understand the law, the engine begins to work like a spent ball upon a ten-pin alley, which runs smoothly in the direction of the pin under a given impulse, and then, as the *force fails*, it begins to

hop, which changes its relations from the primitive impulse to the floor-plank, and, instead of deviating from a right line, it hops over and misses the pin. The engine works truly through the vast induction and change up to one hundred million and two, and then it hops to one hundred million ten thousand and two, while every successive leap grows more and more desperate, till failing to account for its fractions, it runs mad in the loss of its relations. But for this, it would demonstrate the problem of the circulation of the blood truly, as well as that of every other algebraical law, for it marks the changes in the law by combination with surprising exactness.*

But the law of life being a mechanico-vital, instead of a mere mechanical force, is ad-

* If I could choose a mind, I would rather be the contriver of the calculating engine, than the demonstrator of the law of the attraction of gravitation. It is more nearly allied to the adjustment of the great law of causation than any other effort of the human mind, and it is a poor compliment to British sagacity, that this exile of mechanism is not appreciated in the land of its birth.

justed on a principle of changing relations, equipoised by cumulation, and relieved by endless succession—such as I think Mr. Babbage's engine cannot, by any adjustment of its mechanism, truly represent; for this law shows in every change, where it picks up its fractions, which accounts for its increasing force in geometrical progression.

It is a law that nothing short of *Omniscient* foresight could devise, and which nothing finite can adjust. Where the first series fails in the engine at one hundred million and two, the first system of combinations terminates by oxydation in the pulmonary circulation, which introduces the gastric circulation by triangular numbers; the fractions being carried gives the accessional force of ten thousand. Now as before stated, if we suppose the motive force of the circulation of the blood to be given, it begins so slowly, that the rate of motion can only be calculated by the number of combinations; and it would then fail to carry us beyond the first system of relations where the law changes. If we could attain the al-

gebraical calculation to carry us through the second series of relations, to where the law changes a second time; the next series of relations is not only greater by unit than its antecedent, but it is greater by unit of a *system* of relations than its antecedent; and although, while we contemplate the last series in the lymphatic system of relations, we discern the great prize of the law of life at its terminus, and have gained facilities from the demonstration of the second series, by which we may reach the accessional calculations of the third, yet few minds will have patience to encounter the trial.

In the present state of the sciences, preparatory to medical studies, it is hopeless to expect the minds of medical students to be prepared for this pursuit.

If they could be carried through the first series of relations, they must stand upon the threshold of the second, looking on a dark immensity whose shades thicken as they contemplate it; and they would be more inclined to take upon trust the calculating engine for

their guide, and confide in its results, when it is running the succession of its phenomena beyond the reach of their intellects.

The different systems of relation betwixt the digestive, muscular, and bony system, obey the same algebraical law of succession, as that of the different systems of circulation. And here we must leave these systems with the reader, as we have carried them as far as is necessary for our general purpose, which was to show them in their several orders of succession, to be the basis of the superstructure of sensational and mental physiology obeying the same law.*

* It has just occurred to me, that in dynamical physiology I have only stated the law of combining proportions, while the law of decombination is but the continuous process of the same law in the completion of its work, equally expressed by numbers, and proportions of numbers, and geometrical figures.

If we look at the law of combination and decombination, as separate operations apart from each other; if we contemplate it as an apple on its parent stem, ripening till it reaches a condition of repose by perfect combination, and then falling to the ground, and beginning its process to decay, we have no adequate conception of the grasp of the law.

The apple from its bud to its full growth is perpetually throw-

ing off effete properties, to free it from the blooming imperfections of its minority, that prepares it for our taste ripened in the matured juices of its full growth.

Such, too, is the condition of man under the operations of the same law, his higher combinations conducting him to a different destiny. His soul is constantly throwing off effete properties, and renewing them by others better fitted to ripen him into maturity; and when, like the apple, he reaches a condition of repose by perfect combination, he sustains like the apple its equipoise for a shorter or longer time; but by degrees the attractive force begins to give way; and as it retreats into the motive power, the matter grows more and more effete, till it is all thrown off; and this mechanico-vital power, with its attributes more or less matured, liberated from the matter that characterizes this lower range of creation, is no longer fitted for this lower world, and it mounts to another sphere higher in the range of matter, whose atoms are more nearly equipoised, and begins its reconstruction there, surrounded by materials whose combining proportions fit it for an eternal duration.

The experiments of Higgens, Gay-Lussac, and Davy, prove that the combination, as well as the decombination of all bodies, or atoms of matter, are conducted by a definite and invariable ratio of relative weight or measure, as that of 1 part to 1—1 to 2—1 to 3—or 1 to 4; and that every change in the compound thus produced, whether of addition or subtraction, is a precise multiplier or divisor of such ratio. Or in other words, that the oxydizing force which enters into such compounds can never unite or separate, never lay hold or let go of each other in any other proportions. So that the law of causation, with its force of differing intensities in different directions, raises the soul into another state of being, and carries forward the ripening process of organic life in the next stage of its existence.

MENTAL PHYSIOLOGY.

CHAPTER XII.

NERVOUS, MEDULLARY, AND CEREBRAL SYSTEMS OF RELATION.

Every system of physiology that has blessed the medical student, identifies these several systems of relation, and testifies the brain to be the centre of them all. This misconception was in full vogue when Gall took it up, with a generating power of reproduction that magnified and perpetuated the error to the hour of my writing. What a humiliating picture of the human mind, to contemplate a truly great man, with an honest and ardent impetuosity, spending his whole life on a phantom of the imagination. Gall brought all the powers of a gigantic intellect to bear like a burning focus on the brain, radiating its light

through the dark and secret channels hitherto untraversed by the human mind, till the vivid impressions of his own imagination were kindled into public opinion.

His dissections and examinations have thrown a standard light upon the anatomy of that organ, but covered its functions with the mantle of night.

He did not then know, (what will be shortly demonstrated,) that every mind that was charmed with his powers, as well as every mind he was contemplating, *had all its materials* supplied by the *imagination.* Much less did he suspect that his own mind could be influenced by its *false whisperings;* no man living knew better than he did, that the brain was totally *insensible* either to puncture, incision, and even laceration; that portions of it could be torn off when a man is in full possession of his senses, and yet be unconscious of pain or suffering; no man living knew better than he did, that the medulla oblongata was the door-keeper of the brain, and would not allow a sensation to enter it, but reflected every feeling

back upon the *solar centre;* and yet he permitted his great mind to sleep over these colossal facts, and urged his reasoning powers to follow a vivid imagination, till he was called away to exercise renewed attributes upon another and higher scale of being, where the eye that misled him here, is there adjusted upon a principle of equipose, that rectifies the inversion of surrounding objects, and where its focal powers see things *as they are;* and with perceptions thus rectified, the imagination will gather no more false materials; and *then* truth will take the place of contingency, and fact of falsehood.

Sensation, the very element in which every antecedent attribute of mind finds force, is found wanting in the brain. The *nerves* of sensation which begin in the gastric, and assemble together in the *solar centre,* radiate through every other part of the frame, unite in the spinal column, and terminate at the brain.

The primitive fibres of the spinal nerves do not end in the spinal cord, for that would leave a chasm; but continue their course as far as the brain, and end; *not in it,* but *on it,*

withholding from it that *sensation*, which they impart to every other system of relations.

That *pressure* on the brain impairs *sensation*, is an undeniable fact from its never-failing uniformity; and it is *this fact* that has so long deceived the physiologist, and confirmed the errors of the phrenologist.

They argue, if *pressure* on the brain impairs *sensation*, alters the *circulation*, and suspends *voluntary motion*, it obviously implies the brain to be the source of the powers that are paralyzed by the force applied to it. This is a false inference from the fact. Pressure on the brain is not felt by the brain, for it cannot *feel;* every one now knows that it has no *sensation*. But pressure on the brain presses the brain directly on its *door-keeper*, the *medulla oblongata;* and pressure here, when the brain is unmolested, instantly paralyzes the whole system of relations connected with its *reflex* action.*

* Almost every medical man of extended experience has seen local injuries of the *medulla oblongata*, when the patient lived from three to four days, without consciousness of *sensation*, or *voluntary motion*, and the brain entirely undisturbed in its functions.

The whole of this mystery about the brain results from the conviction that it is the *centre* of the nervous system; an error that will multiply false inferences for ever.

If we should adopt the following rule in physiology, and in every other thing appertaining to life, with complex relations, namely, never to identify organs that differ from each other both in *structure* and in *function*—we should keep our way clear.

We have now under consideration, the *nervous*, *medullary*, and *cerebral* systems of relation, that differ so obviously and so essentially from each other, both in *structure* and in *function*, that we need only mention the nervous power to be the source and centre of *sensation*, and the *brain*, its reputed centre, to be totally devoid of it.

The testimony of each of these organs conflicts with that of every other, and the brain bears the reproach of the whole evidence embodied.

Hence the brain is regarded as the seat of the affections, emotions and passions,—than

which nothing can be farther from the truth. These belong to the *nervous system*, and have their home in the *solar centre*, which is the *circle* of their domestic relations; *here* they "live and move and have their being."

The nervous system of relations terminates with the spinal marrow, where the combinations of the law change, and introduce the medulla oblongata; where again, the combinations of the law's final change terminate with the cerebral system of relations, which constitute the summit of its power on the present scale of the mind's adjustment.

Sensational Physiology extends to, and covers that mental state only which relates immediately to the production of sensations, and is limited to *association*, *memory*, *imagination*, *will* and *conscience*; these are feelings, affections, emotions and passions, that are derived from the *solar centre*, and live apart from the pure intellect, which is a higher power, separated from its connection with sensation by the *reflex* action of the medulla oblongata.

Now, the order of *mental succession* must correspond with the order of *physical development*. If the rudimental structure of the infant begins with the nerve and ends with the brain, the sensational development must observe the same rule of order, as far as it goes; for matter being the mere instrument of mind, must obey its forces. In every movement of the affections, as well as in every mental process, there must be an attendant organic process. Or in other words, the organ in which the sensation resides must respond to the action of that sensation, as the *instrument* of its *will*. The will then cannot have its *centre* in the brain.

The reader will now understand that the sensational physiology of man is bounded by his will, and that the infant must remain a sensational being till its mental attributes are developed; and this is delayed to a late period, till the brain, which is soft in its texture and imperfectly organized, becomes capable of receiving *mental impressions*.

Indeed, it must pass through its stage of

infancy and terminate its period of childhood, before the brain acquires sufficient firmness to receive and retain *mental impressions.*

INFANCY.

The general order of structure being given, the infant just born offers itself to our observation as an animated structure, cut off from the primary stage of its being, and now totally dependent for the succession of its phenomena on the sensations of nutrition.

The first natural sensation it has, upon which sensational succession in phenomena can be predicated, is that of hunger.

Of this it must be *conscious.* The *sensation* and *consciousness of it, coexisting*, constitute its first *experience.* Whatever may be the diversity in human character, in this, their beginning experience, they are all alike. When the child nurses, *combinations* begin with the outward world, and the blending of the mother's milk with the gastric juice, produces the first sensation of hunger *gratified ;* and this is its second experience.

Here children begin to differ from each other, in the ratio of their different digestive sensations; and the diversity of character begins. The child now remains nearly stationary, till repeated experiences within very narrow limits of gratified hunger, enable it to *associate;* then mental combinations begin to grow rapidly, and *memory* combines itself with *association*, and their mutual inter-action produce the imagination, and the *will to enjoy* springs into being.

The action and inter-action of these attributes of *sensation* upon each other, constitute the whole range of the infant's mind. At first it is only conscious of *sensation*, then of *association*, then of *memory*, then of *imagination*, and lastly of *will.*

Consciousness, rising up through all these attributes, constitutes their mutual dependence and imperishable relations. They rise, one from the other in this order of succession; *sensation*, *consciousness*, *association*, *memory*, *imagination* and *will*, all of which find their element in sensation.

In animal physiology, it was shown that sensation adjusted but four perceptions, to open its intercourse with the external world: The infant has five; the sense of touch being a perception and not a sensation; namely, sight, smell, taste, hearing, and touch. In proof that the gastric nerve (and not the brain) is the focal centre of these perceptions, we need only refer to our experience of an *offensive* object of sight, smell, taste, or even touch, in producing nausea; while sawing, grating sounds upon the ear, will often produce vomiting and faintness. On the other hand, all ageeable objects of sight, smell, hearing, taste, and touch, are returned from these external perceptions to the gastric nerve, and sent directly into the *solar circle*, to be associated for radiation from that *sensitive sun* of the nervous system, to every part of the frame.

The infant has, as yet, derived but little knowledge from the external world, through the medium of its outward perceptions. The eye sees all objects inverted,—the smell dis-

tinguishes no odors,–it hears without discriminating sounds,—its touch discerns no properties in bodies,—while its taste alone is true; and this *truth* binds it imperishably to its mother. Whatever else is wrong or in confusion, there is always the perception of *truth* in its mother.

Hence its sensations of consciousness, association, memory, imagination, and will, are chiefly employed during its period of infancy, in the gratifying desires of nutrition with its mother.

CHILDHOOD.

Childhood is but the continuation of the antecedent circumstances of infancy, with more experience in the use of its faculties. The gradual transition from one state to the other, may mark the period of childhood as having begun at three years old. The sign of this distinction, however, is to be found in a well-defined conscience, which I have not seen clearly developed till the child was five years

old,—as the conscience is a contingent faculty, and not an element of mind, it may vary in the time of its appearance, to distinguish this era of progression from that of infancy.

The observer, in seeking for a conscience, must not mistake the fluctuating emotions of consciousness which is characteristic of infancy, for the conscience of childhood. At whatever period it may be found fully developed, the circle of moral relations is filled up and fitted for a higher degree of cultivation than it has been hitherto susceptible of.

This point of relation in the child's history presents the deepest interest to a parent, as the well-being of the child, *then* and *thereafter*, depends upon the moral order in which these relations are cultivated and sustained.

The parent must not rely upon the conscience, however tender it may be, for a balance wheel to protect its moral order from the strong sensations of childhood.

No day should be allowed to pass by at this tender age without searching for the inroads which sensations have made upon the

temperament and conscience, and carefully adjusting the balance by the most delicate and tender admonitions.

For the association of ideas, arising from the sensations which the different perceptions introduce, have nothing to govern them. They take their course uncontrolled and unregulated, and play on at random, mingling all heterogeneous objects together, and exhibit them in every variety and perversity of will. Self-government is entirely out of the question, and harsh measures should never be taken with a being whose perceptions are not rightly adjusted; yet I must not be understood as saying that discriminating measures should not be adapted to different temperaments.

If the perceptions were rightly adjusted, children would be less at fault; but when we recall the painful fact, that sight, which spreads its sensations over extension, presents all objects at first in wrong positions, we see an adequate cause for the association of error, that must progressively increase, till the sense of touch, by experience in the use of it, may

be far enough advanced, gradually to rectify this perception.

There is an extended period then, over which little else than error may reign; yet, painful as this conviction may be, in the end we shall be satisfied with the beneficent design.

MEMORY.

As *association* rises from the *consciousness* of *sensation*, so *memory* rises out of the *consciousness* of *association*, and comes to be the fourth faculty of mind. Being a quaternary combination, its range is limited to recording past states of feeling, while at the same time it is seen taking notes in short-hand of the materials supplied by the imagination, to write them out afterwards.

IMAGINATION.

I have before stated that consciousness was a compound of sensation, and rather an

impulsive *faculty* of mind, rising up and modifying its relations. Consciousness, blended with memory, throws its sensations forward, and constitutes the imagination.

Being the four-fifth combination of mind, it rises into arithmetical progression; and in giving it its widest range of action, it is found to be the constructing faculty of mind, and furnishes all its materials.

To our finite capacity, this would be the only faculty not to be trusted with the destiny of mind; for it gathers every thing with an indiscriminate hand.

Objects of every conceivable diversity of character, both true and false, are garnered up and deposited promiscuously in the mind. From nothing, it can equally call into ideal being, objects clothed with beauty or deformity. It is acting as much in obedience to its own nature in perverting mental associations, as in cultivating the most sublime truths. Unrestrained by time and distance, it is familiar with all scenes, and present in all places.

If we contemplate it in its official capacity, we behold it gathering in doubtful materials on its own account, and also all false impressions, added by means of the delusion in our perceptions.

It would seem that the mind, by constant watchfulness and care, might progressively acquire, by its experience and observation, the power of detecting a false object when it is introduced into its associations. But this presumption fails when we examine it, for there is another and deeper ground of delusion undisclosed.

"When the imagination introduces a false object, the accompanying sensation or emotion produced by it is as *real* as if the object itself were true, and the pleasurable emotion, if it be one, is sent forward among the social feelings, and entertained by them all. The delusion here arises from the *reality* of the emotion being produced by a false object;"— so that the mind, instead of being capable of analyzing the object, is *itself deceived* by the *sensation* which the object produces.

Yet the Omniscient eye foresaw that without this faculty exactly as it was made, the object of man's creation would be defeated; for it is the only faculty which he can send forward to futurity, and recall to return its report. Deprived of this power, as it is now adjusted, we could not anticipate coming events, we should be stationary in the world of mind and matter, contemplating only our past experience, while the coming moment with its coming hour, would be the threshold of darkness,—"a darkness into which no ray of light could cast forward the glimmering of a hope, and no effort of mind could dispel the coming gloom." There could be no poets, no philosophers, no men of genius, no examination of the heavens, and no worship of God,—and man would have been created in vain.

WILL.

Having traced *consciousness*, *association*, *memory*, and *imagination*, through their combinations into the beginning of arithmetical

progression, we come next to that determining faculty the *will*,—and the order of its antecedent relations will determine the character of its power.

It stands in the arithmetical combination of five-sixths in the order of its succession from sensation, and it must necessarily obey the force of its antecedent relations, unless the conscience, next in order, should hold *higher combinations*.

Many theologians, as well as moralists, are of the latter opinion. Methodists, and Presbyterians, (both new and old school,) Lutherans and Dutch Reformed, as well as most other denominations, are *all* unsettled about the powers of the *will*, and are filled with strife about liberty and necessity, predestination and free-will, natural and moral ability, limited and general atonement, &c.

Now, whatever may be their *other* differences of opinion, I believe they all concur in one fundamental error—namely, that the will possesses *independent volition*, with the undivided power of *choosing* or *refusing*; and

hence the load which theology staggers under.

If we confer on it independent volition, with the power of *choosing* or *refusing*, it takes the whole command of mind, and assumes all its responsibilities.

Grant this, and where does it land us? It stands an isolated faculty, *without a cause* in the creation of mind,—leaps over the limitations of our nature,—repudiates all agency, and *acknowledges* no *dependence* whatever. Having begun to exist, it *must have a cause*, and this is found in its prior phenomena; and it must be conceded that *they* determine the will, clearly as the intensity of the force they derive from sensation, whatever the force may be.

It is true of the will, that in its executive capacity it is always in command; but the command is a derived power, subject to the prior authority of sensation.

Its *freedom* consists in being free to obey any or *all* the fluctuating sensations of man, as well as free from all *responsibility* in exe-

cuting orders. When we think we do as we like, we are often impelled by causes whose immediate influence over us we do not discern.

That the will should have been wrenched from its position in the order of its natural succession, and remained in disorder so long, is to me the greatest paradox of mind. For any one, no matter what his habits of thinking are, *must see* with *intuitive certainty*, the first time he examines his will, that the *antecedent circumstances* determine its action, and the succeeding circumstances are but a continuation of the preceding circumstances that determined it.

CONSCIENCE.

The order of succession in which the conscience comes up, would give it the command over the feelings and affections, if it could claim to be one of the primitive faculties of the mind, designed to complete the circle of its moral relations. But it must at once strike

the observer that conscience is a *contingent faculty*, and that there could be no conscience without a prior transgression. If man had never disobeyed, the sensation of a conscience would be unfelt, and the power of conscience undeveloped and unknown at this time. The evidence of his having disobeyed, is found in the fact of his having a conscience, as well as in the fact of antecedent errors having crept in, through the agency of an indiscriminate imagination. The rudimental antecedent of the conscience is found to rise out of *consciousness*, the first *product* of sensation. If it could trace a direct line back to sensation, it would stand on a higher footing than its antecedent relations.

It was the memory of a wrong act, *associated* with the *sensation* of it, that brought in the *imagination* to act upon the *will*, to elect a conscience, to guard the moral relations from the future errors of the *imagination*. In political parlance it was the expression of an election by the people in a unanimous vote. Considered in its official capacity, the con-

science is a feeling of the mind, standing in associated relations to, and growing out of the antecedent feelings, of which it is itself a part, deriving its power and authority directly from its prior relations.

SENSATION AND CONSCIENCE—THEIR RELATIVE POWERS CONTRASTED.

It is at once perceived that sensation and conscience form the outward boundary of our moral relations; and that sensation stands to conscience in the relation of motive to attractive force.

Sensation being the starting post of all these relations, an examination of its power will give us the probabilities of the success of its command over the feelings of the mind, when the conscience stands opposed to it. The infinitely diversified character of the human race, with all their differing temperaments, follow the train of the differing intensities of sensation. Sensation then furnishes the temperament, and the temperament is the

expression of the force, that is brought to bear directly on the conscience, in direct association with itself. Our expectation that a conscience, thus situated, can retain its command, is founded, not in its own powers, but in the moderation of the temperament it is called on to oppose.

We look in vain then for the source of our responsibilities, either in the conscience or the will; these, together with association, memory, and imagination, are but *faculties* of an *element*, whose dominion must be complete over the things it has made.

EMOTIONS AND PASSIONS.

Having finished the consideration of the sensational attributes in the order of their respective relations, we come next to inquire—What are the emotions and passions? And whence do they come from the chamber of the soul?

We look for emotions in the expression of the face—for passion in the expression of the whole frame.

The respiratory nerve that spreads itself beneath the skin, and through the muscles of the face, is the agent of expression there, when sensation is working under the influence of emotion.

But sensation fluctuates like an undulating sea in its ever restless motion. When it stands at its ordinary maximum, consciousness, association, memory, imagination, and will are working at their ordinary rates of motion. Then it is serene in its unruffled dignity and repose; but when we love its quiet equanimity, we "know not when the storm may rise to transform its beauty into darkness and terror."

The face that so lately beamed with all the higher and loftier attributes of our moral nature, when its sensation is touched by anger, becomes distorted with the feelings of revenge. If chafed a little more, anger becomes rage—a still lower passion, unregulated and uncontrolled by the senses.

EXTERNAL PERCEPTIONS OF SIGHT AND TOUCH,

Together with their different rates of motion, and different spheres in which they respectively move.

Having considered sensation and its attributes in their mutual relations and dependence, and having alluded to the imperfect adjustment of our external perceptions as one cause of our various mistakes and errors, we come next to a special examination of sight and touch; that the reader may prepare his mind through the agency of the perception of touch, to enter into the higher fractional combinations, that are to distinguish our mental from our moral relations.

Of the five senses, only two, sight and touch, spread their sensations over extension, and each of these over a different extension. There is the most constant relation subsisting between these senses; and the relation is so uniform, that whatever affects the sight, may affect the touch, and the converse.

The vastness of the field over which the faculty of vision gives us a command, together

with the precision and permanence of this class of perceptions, impels us almost irresistibly to believe, that in spite of the wrong adjustment of the eye, nothing material can escape it.

But the presumption that the eye sees whatever is material, fails upon a close examination.

Suppose a substance or property of matter to be placed at a given distance within the axis of vision, and this property or substance should bear no analogy or resemblance to any other property or substance which had been before embraced by its focal powers; what knowledge could be gained of its *material* properties? Clearly, little or nothing; it would be as nearly the first experience of sight, as the first application of its focal powers in infancy, when all objects were inverted.

If we close our eyes, and submit this substance to the perception of touch, its material properties become known and discriminated.

We forget, from habit, that our vision in this world must be always struggling with the

infirmity of its primitive adjustment; and if it were now right, there would be no room for improvement in the next stage of our being, where we are to see things *as they are.*

Now, in order to know the different spheres in which the perceptions of sight and touch, respectively move, they must be classed in the order of their natural succession.

The first four perceptions of sight, smell, taste and hearing, are formed in their successive order, in the arithmetical progression of combinations, and find their focal centre in the solar circle.

The face, in which sight, smell and taste reside, and the *base* of the skull where the hearing is, are formed while the extremities are yet stumps; while the deposit of brain for the pure intellect, and the fingers for the perception of touch, are yet to appear.

The perceptions of sight, smell, taste and hearing, are all vivid senses, that gain and give up their sensations to the memory on the passing moment, while the perception of the sense of touch is less vivid but more lasting.

In contradistinction to the four associated vivid senses, the touch is seen acting singly and by itself, slowly weighing its testimony in arithmetical progression and in *equal quantities.*

It is at once seen, that perceptions so different in their sensibilities, but more especially in their rates of motion, cannot have the same focal centre for their different theatres of action. The vivid senses must have a vivid centre, whose organic transitions are in exact correspondence with its rapid motions; while the sense of touch must have a *table* on which to write the slow records of its evidence.

That the solar circle is the focal centre of the vivid senses, is shown by its radiating force, from which they derive the impulse of sensation, and where their associated acts are so rapid and transient, that the memory can only take notes in short-hand, and write them out afterward; the vividness of impression depending on the vividness of feeling that produced them.

The manner and mode of action—in which the feelings, affections and emotions, under the influence of the four vivid perceptions, radiate from the solar circle through nine different plexuses of nerves—spreading their undulating sensations throughout the frame as far as we have advanced—fluctuating from the gentlest emotion to the highest storm of passion—(if I have made myself understood)—is clearly set before the reader's mind; and in tracing out these several plexuses as they radiate from the solar centre, into all their diversified distributions and relations, it will localize and bring to light every physical and moral relation, as well as every passion and tint of emotion by which the frame (as far as it is examined) is swayed or actuated.

We have now finished the circle of the mind's action in the first system of its triune relations in childhood, so far as it is characterized by arithmetical combinations; and in which is exhibited only the *morale* of mind, that defines the extent and boundary of intuition.

MEDULLA OBLONGATA.

As there is neither beginning, middle, nor end to any system of relations, it is difficult to stop and begin again any where with any system without disturbing the harmony of the whole. I now perceive for the first time my mistake, in not having more fully described the medulla oblongata together with its function, in the system of arithmetical relations, as it belongs to that system. I have for my excuse here, that this is my first attempt at writing a book, and faults of arrangement must be expected from journeymen learning a trade.

The medulla is a middle substance, betwixt the spinal marrow and the brain; and stands in the order of succession betwixt the spinal marrow as its antecedent, and the *brain* as the terminus of succession; differing from both in its structure and function.

It is distinguished by properties that mark its peculiarities with great interest. In it are found no nerves; and yet there is found in it

the termination of the motive force of the nervous system, reflecting back into the spinal marrow, with an accessional power inversely as the force of the cumulative impulse. It is shown of this substance, that it has the power of reflecting both motion and sensation, in a higher degree, than any portion of the nervous system; and the nerves that connect with it have a higher reflex action than any other nerves in the human frame. It is through the medium of this substance that the circle of motive attraction is joined to its endless relations in the solar circle, and renders its arithmetical combinations complete.

BRAIN.

We are now crossing the unbroken yet dividing line betwixt arithmetical combinations and its fractional relations—betwixt the sensational and mental attributes.

Having shown the nature of the physical and functional relations of the medulla to the spinal marrow in its reflex action, we come

next to consider its physical and functional termination in the brain.

Its termination in the brain is called corpora pyrimidalea: two pyramidal bodies that reach up to the crura of the brain; and prolongations of it extend into the brain, by which the physical connection betwixt these two organs is established.

It is admitted to possess the general properties of the spinal cord, while in its connection with the brain, and its prolongations into it, it carries forward no properties whatever of *sensation*.

But it is its high reflex action that constitutes it a *door-keeper* for the brain, to protect its council-chamber from the disturbance of *sensations*, or any of the emotions, or feelings, or passions of the mind below.

Lastly—It has another property, that resolves the problem of mental physiology; it is the receptacle of the sense of *touch*, and for this we have the authority of Muller's experiments.

I have stated that touch is not a vivid sense,

but that it retains its impressions, and takes its evidence slowly, and in arithmetical progression, and in the accumulation of equal quantities. This, then, can be the only sense apposite to the pure intellect, and the only one competent to carry evidence to the mind, by which truths of the highest and subtlest kind can be determined, on the present scale of the mind's adjustment.

The question will immediately rise in the mind of the reader, and especially in that of the anatomist, by what physical combination the law of causation separated the sense of touch from its fellows, and carried it to the medulla oblongata. Here it is found at the door of the council-chamber, waiting admittance; and the survey of its pathway there, without one further experiment, must admit of some little conjectural latitude. When the sense of touch is associated with an offensive object, we have seen the sensation immediately felt in the stomach.

Now here is found a very remarkable physical connection betwixt the stomach and the

medulla, by means of the *pneumo-gastric nerve*,* which rises from the cardiac plexus of the stomach, and goes directly to connect itself with the medulla where the sense of touch is found by Muller's experiments. If this nerve in man could be separated from its cervical connection with the medulla, it might unfold the past history of the sense of touch in its by-path to the brain.

From its want of vividness, it could not be expected to be taken up and radiated by the solar plexus, nor by any other nerves which have ganglia, by which vividness is imparted to sensation. From its unobtrusive and passive character, and the nature of the information it bears, it would seem to expect a plain open channel, in a nerve without ganglia, where it could convey its own intelligence undisturbed by sensation.

Having reached the medulla by whatever channel it may, it is carried forward through its prolongations to the brain; and there reason and judgment, with one witness and closed

* See plate in front.

doors, resolve themselves into a court of equity, analyze the evidence, and review the decisions of the fluctuating court below, and dispense justice and judgment in accordance with the evidence brought before it.

The verdict is returned by the reflex action of the medulla to the solar circle, and the feelings of the mind obey the judgment.

RESPONSIBILITY.

It was but a just and reasonable expectation that our *accountability* should be found, not in the lower range of our faculties, but in the highest attributes of the pure intellect; for these alone can govern the temperament and the heart. It is here, away in the secret treasures of mental physiology, in the highest fractional hair-splitting combinations of mind, where subtle truths are weighed in the balance undisturbed by sensation, and where rights and obligations are sifted, separated and analyzed, and where they are found to be co-equal, co-existent, and co-eternal. It is here

that the perception of obligations begins, spreading their relations with their growth, and interweaving them with all the mutual relations which bind man to his fellow-being, and also that higher relation which binds his faithful agency to his God.

THE HUMAN MIND

Has two methods of arriving at a conclusion: — Importance of knowing the distinction.

It is seen that the sensational mind, governed by arithmetical combinations, is complete in itself, as far as it extends. Constituted as it is, it has its own independent mode of ratiocination. From the vividness of its perceptions it is always foremost on the theatre of mental action, and preoccupies the mind by drawing the first conclusion; and by the rapid energy of its associations, seems effectually to set aside the supervisory power and authority of the pure intellect.

A definite conclusion, being thus hurried in through the medium of the feelings, takes the

mind by surprise; and it is no wonder that inferences thus drawn from association in agreement, should, by the majority of mankind, be mistaken for a judgment. Yet in this way, nine-tenths of the so-called judgments of men are made up.

If the first inference fails to make a conclusion, it makes a bias; if the second inference corresponds, the bias is increased; and if the third inference is in *agreement*, the conclusion is formed and mistaken for a judgment. Now no inference nor any given number of inferences, however they may coincide, can of themselves form a judgment; as the decision by inference is come to before the judgment is reached.

With this distinction in the two processes of ratiocination, in the human mind, it is perceived, it has two methods of coming to a conclusion.

The one by contingency, where the materials are gathered from the feelings and passions, and where *truth may be found by accident;* the other by analogy, where *truth* is

found by a process of reasoning upon facts, which forms a judgment.

The conclusions thus drawn by the human mind, divide the human race into two classes. The first, and by far the largest class, feel to its greatest extent, and if they judge at all, judge afterward,—while the second, which is a small minority that dwindle, as we contemplate them, *judge* first and *feel* afterward.

CHAPTER XIII.

WHAT IS TRUTH?

HAVING shown the construction of the mind by law, we are next led to analyze its highest attainment,—namely, truth. If the reader has obtained and kept in his mind, a clear conception of the working principle of the law of causation, he will see that the law can make no one thing perfect,—nor can it make any two things precisely alike,—nor can it have any fixed standard of adjustment; as it is equipoised on a scale of shifting relations, always *advancing* by reason of its perpetual combinations.

This truth is universal in the products of the law, and must harmonize every department of the work of God,—and yet, we find,

that even a universal truth is under the dominion of this presiding law, and can have no fixed standard of adjustment; as *it too*, is made up of truths, that are for ever changing their relations.

If the phenomena of nature were always the same, constantly repeated, as they are brought before us, we could then gain possession of a standard; but the truths of nature, are all *relative truths*, in which there is *nothing fixed but change;* whose constancy in change never falters, and never tires,—they are one unbroken infinite manifestation of variety.

The law of causation never ebbs,—never rests,—and is never out of order in the succession of its phenomena,—and never *repeats them.*

On the silent current of its generating force, it makes no two things alike,—nor have we any test that such a thing is possible. Over any given area, if it be a thousand square miles, where the snow may be found from three, to five feet deep, no two snow-flakes, in this vast body, will be found to have crystallized in

the same form. It makes no two minerals or metals, or crystals, or plants, or flowers, or shrubs alike. There is no tree in the forest, whose branches observe the same curve in their arches;—no two leaves on the same tree that cannot be told one from another. There are no squares with all their angles exactly adjusted,—no circles with all their radii exactly equal. The equality of all the radii of a circle is true of all circles, so far as it is true of any one, but it is not exactly true of any circle; it is only so nearly true, that we correct our conclusions, by combining with them a fresh set of propositions relating to the aberration.

There are no two sensations alike, nor any two minds alike, that spring from sensation, and the moral natures, diverging from these, never take the same pathway, "and out of this varying, and yet agreeing beauty, it is by long attention only that the conception of the constant character, the ideal form *hinted at by all, yet assumed by none*, is fixed upon the mind for its standard of truth.

The *standard of truth* then is no other than the embodiment, by the law of causation, of the entire system of creation, which no finite mind can ever comprehend.

If we take out a part and attempt to individuate it, we lose its antecedent changing and successive relations.

Our province then is, to study the *relations* with the *degrees* in the relations, in connection with their general bearing upon the whole; and when illimitable ages shall have passed away, and a new era of limitless duration begins, this study will still be a part of our educational system, and we shall never reach a standard of truth. Having gained only a conception of a standard, and lost the hope of attaining it, it by no means lessens the grandeur and dignity of design, in pursuing the knowledge of its relations—the field of inquiry being as boundless in the one as in the other. And we are entirely sure, that it contains within its elements the component parts of all truth, to which we can go, and from which we can take any part, with the confiding assu-

rance that it will not mislead us, *with two provisos ;* and first, provided we regard it as a *relative* and not an *absolute truth ;* for there is no absolute isolated truth in this lower range of creation ; and secondly, provided we take it from the mass in the order of its succession. *This, its order of succession,* is the next step, after the standard of truth is defined to be unattainable, to the investigation of the great law of causation.

Should we take out a part from the general mass indiscriminately, without a knowledge of its antecedent changing and successive relations, it would stand an isolated phenomenon, without a *cause* in the creation of matter ; and all attempts to investigate its properties would fail us. It would be like taking the digit 2 away from its relations with 1 and 3, and attempting to use it as a numerical force in the solution of a mathematical problem. But should we select a part from the general mass, as we would the digit 2 in its relations with 1 and 3, it immediately assumes the dignity of a truth in its place, and comes to be

one of the imperishable relations of truth to its standard.

This great pyramid of truth then (for it cannot be called standard), which comprehends all elements of mind and matter in their multiplying combinations, as well as in their endless systems of relation, is given to us, made up and finished, that the human mind may exercise and enlarge its powers, by working out the problem of their primitive forces.

The analysis of this compound force of the pyramid of truth, with all its multiplying systems of combination, will bring out the same results that were foreseen to ensue from its primitive adjustment.

A compound has parts, and parts are degrees, and degrees are deviations from the standard, as well as from each other. The degrees themselves being the difference, the difference is always changing, and therefore contain no *fixed truth*, because they contain no *reality*. Here we have the painful truth demonstrated, that *truth* has no *reality;* but we are immediately consoled by the discovery

that the relation of a part to the whole is not a truth *fixed* but *changing:* that is, all truths are necessarily imperfect, yet perpetually changing for the better. *This then* is the adjustment of the principle of the great law of universal causation, and nothing is little that relates to this law.

He who bestows the least study on the law of causation in the production of matter, must see with intuitive certainty, if the law was otherwise constituted, was it based on a fixed standard of adjustment, the phenomena of nature would be always the same, and a standard would follow, beyond which there could be no improvement. All things being perfect, there could be no after progress, and the working principle of the law of causation would abruptly stop, and the whole mechanism of the universe tumble into chaos, and give no moment of warning to the inhabitants of earth. It is the *imperfection* of the individual parts that sustains the operation of the general law, by reason of ceaseless and multiplying combinations, the very spirit of

which is eternal progression. On this spirit of undeviating advancement is founded all our hopes of happiness, as well as the just expectation that we are beings of endless duration.

The declaration of St. Paul "that now we see through a glass darkly," seemed to have been but an accidental thought when taken in its connections, but contemplated as a law of nature it is pregnant with immortal truth; and we behold in it a cause, which our reason approves, of the imperfection of all things here below. If man was made perfect in himself, it would sever the chain of his antecedent and successive relations, break the limitations of the law, and place him on a footing with his Maker. He is perfect then, as all other products of the law are perfect, *only* in his *relations.*

His relations are perfect to his parents, to his wife and children, to his neighbor, and his neighbor to himself: and what *can* be more perfect than the relation of mother and child, and brother and sister? The *inequality* in society, too, is perfect in its relations, as it is

only unequal forces that harmonize in the mutual support of each other, while forces that are equal are of opposite momenta. In these relations man has the power to fulfil the duties that appertain to his relations, and fill up the measure of his destiny—a power that adds dignity to his station, and obedience to his command. He may err in the performance of his relative duties, but it is not that he has faults that he is to blame. The highest human excellence is blended with its imperfections, and seen under many limitations, shaded in all its lineaments, and dethroned in its moral purity; these are his natural inheritance, for which he is *not responsible, per se*, yet he is relatively responsible, for every act and deed of his life.

If he fails in his relative duties, under the guidance of a watchful care, he has only to turn to his Maker, and find his relations perfect there. It is true, his finite relation to infinity falls short of a union, and leaves a chasm over which he cannot leap; but just where his strength fails him, God in his imperishable

relations to him, as Maker and Preserver, meets him and takes him up. If his relations here have been fulfilled in the fear and love of God, the harmony is complete; if they have not, we leave *him* to judge what may be his condition in another state of being.

I repeat again that it is not in himself, apart from his relations, that his responsibilities germinate; they spring out of himself, as a being of *relation*, and here they are visibly planted, and left to grow under his own cultivation. If he cherish sins till they consume his energies, the gangrene becomes incurable, and abused mercies work out their own revenge; but if he cultivate them with a watchful care, they grow and shine forth, bud and blossom are in full bloom, and ripe fruit altogether. He must intuitively see that there is in the mere transition from one state of being to another, nothing calculated to purify his nature, or make him a better man; and he is always to remember that the truths in the Bible are the only teachings he can lay hold of in this world, not made by the law of causation;—

the only things that are above and beyond the law, and sent as his guiding star in time of need.

Who among us would not embrace the hope of the penitent thief on the right of the cross, rather than await the expectation of the railer on the left? Vices that are concealed in this world will be disclosed in the next; and the distinctions in society must be founded on the disclosures to be made there. So that if any man be anxious to learn what his station may be there, he has only to call up and array all his secret sins before him here, and suppose them to be made public, and he will at once learn, how many friends he values most highly that are now in close communion with him, would abandon the connection, and let him down to a lower standard of moral rectitude, to associate with a circle that he would now be unwilling to recognize, and ashamed to acknowledge.

OBJECT OF THE LAW OF CAUSATION.

If we may judge of motives, from a knowledge of the principle, we should say that the leading object in the construction of the law appears to be that of gauging it to a principle of adjustment, that will sustain it in perpetual operation, by means of new combinations throughout all time, without bringing any one of its combinations into a state of perfection.

For it is apparent, if any one product of the law was made perfect, another must follow; and as it is a perpetually germinating force, perhaps in a day or an hour the whole work might finish, and a blight fall on this fair creation.

But, secondly, any one thing made perfect in itself breaks through the limitations that the law has assigned to it, and becomes a part of infinity; as no one thing that is perfect *per se* can be finite.

The perfect working of the law, then, con-

sists in its adjustment to a principle on which it will work throughout eternity, and make no one thing perfect in itself; yet *perfect* in its relations, *perfect* as a whole, and imperfect in its parts; an adjustment of changing relations, based on a force of permanent elasticity, that will spread the varied charms of novelty for ever over the creation of mind and matter.

LAW OF CAUSATION—A PRE-HUMAN LAW.

The law of causation, from its continued uniformity and unbroken change in the production of matter, is a pre-human enactment, contemplated in the foundation of the world; and from which, in his proper order of succession, our first parent sprung. The question at once rises, whether the first mind it generated into moral and mental combinations, is not the same pattern that belonged to the whole antediluvian race, and descended by Noah through the flood, and is transmitted to us of the present day. The same general

law that constructed the first pattern has most certainly superintended, *unchecked*, the mould of every succeeding race, and is in full force now.

What change, then, was wrought in Adam by his disregard of the Divine command?

This is one of the most solemn questions that can now be brought under consideration, and it should be weighed with all the candor and care that its consequences involve; for the testimony of the transgression of Adam is one of the most incontestable historic evidences on record in the Bible. I mean the historic evidence of the fact of our first parents' disregard of the Divine command is incontrovertible, and we have arrived at it in the full knowledge of the principle of the law, that must explain its own government over his mind.

The law is *perfect* in its *relations*, perfect as a whole, fulfilling its ultimate destiny on the highest scale of truthful relations, and in order to accomplish this, the great object of its enactment, it must needs be imperfect in its

parts. Our first parent then was imperfect in himself If the law of causation be true, if man was perfect only in his relations and imperfect in himself, and the race of man has been in ceaseless progress from the beginning, —what could have been expected from a being thus organized on the lowest scale of human intelligence, who was incapable of detecting a false object when introduced into the circle of its association, and when the accompanying sensation produced by it, was as *real* as if the object itself were true, and when the mind, instead of being capable of analyzing the object, is itself deceived by the sensation which the object produces ?

I will not decide this question, as the law has anticipated me, and left it without debate.

LOGICAL ORDER OF MIND.

Things and *principles* are known to us, and distinguished by us, *only* by their *deviation* from a *standard.*

That we may know the logical order of our

first parents' mind, it is only necessary to introduce, to our own mind, its own logical order.

We have just been analyzing truth, and demonstrated it to be adjusted on a principle of changing relations, and *proved* that the highest idea, that any mind can reach, is an *ideal* standard of truth. Hence the ideal standard of truth must vary, in proportion to the order of mind that contemplates it. But the highest mind cannot get above its own ideal standard, and as it can know its standard only by its *deviations*, it must always be at work on the down-hill side of it. One deviation sends it down one degree, the next two degrees, the next three degrees, the next four degrees, and so on, till the standard of truth is exhausted of its deviations.

Now what are these deviations, and the degrees in *their* deviations, but so many falsehoods? *for every deviation from truth is falsehood.* Falsehood, then, comes to be the phenomena of truth, and truth can only be known through the *medium* of falsehood.

HOLINESS.

The highest mind cannot get above its own ideal standard of holiness, and as it can know the standard only by its *deviations*, its working station must be always on the down-hill side of its standard. One deviation sends it down one degree, the next two degrees, the next three degrees, the next four degrees, and so on till the standard of holiness is exhausted.

Now, what are these deviations and the degrees in their deviations, but so many sins? for every deviation from holiness is sin.

Sin then comes to be the phenomena of holiness, and holiness can only be known through the medium of sin. Every faculty of mind is fixed to this order, and demonstrable by this principle.

With a full knowledge of this principle, it would have been idle to have given to our first parent a *law*. He could only comprehend a prohibition and a command; and his mind must have been commanded to stand

still, if it did not work by *deviations;* and the first deviation was a sin, and necessarily a transgression of the command.

THE CURSE.

Then follows the curse, "for in the day that thou eatest thereof, thou shalt surely die."

If Adam could have then known the principle of the law and its adjustment, he would have known that both death and resurrection was contemplated as an essential element of the law before he was created.

What means then the prohibition and command, but to put Adam in a state of *moral training*, as we put our own children in a state of *moral training* by prohibition and command, to bring them from lower to higher states?

A moral law was clearly not called for, till a moral faculty was developed by this simple mode of training.

When God created Adam, "he blessed him," and under this blessing, he "multiplied and replenished the earth," and hence the

blessing extended to the whole race; nor can I find any historic evidence narrated in the Bible, where this blessing was recalled and supplanted by a curse.

It is not long since that I heard a great and good man, for whom I entertain a profound respect and admiration, and who in my humble opinion stands second to no other theologian of this or any other age, take for his text that passage in the 17th verse of the 3d chapter of Genesis, where God, in addressing Adam after his transgression, says, "cursed is the ground for thy sake."

His interpretation of the passage was this; namely, "cursed is the ground for the sake of Adam's sin." The argument was, as it always is with him, deep, profound, and logical; clear, bright, and convincing; and no fault or weakness or fissure could be detected in the iron chain that he threw about his hearers.

The whole discourse visibly made a solemn impression, and every member of the congregation appeared to feel deeply the force and weight of the argument.

No fault whatever could be found with the argument, the fault was in the *fact.* The curse here narrated stands in the same relation as the penalty of death; both were contemplated as parts of causation before the foundation of the world, and the interpretation that I should put upon this text, as a matter of scientific exploration, is more in conformity with the circumstances that flow from the narrative; namely, cursed is the ground for the sake of Adam's blessing.

If we examine the earth, from its infancy to its age, we are struck with its improvement in proportion to its years; for the vegetable substances that clothe it with green in every summer's sun derive at least one half their solid matter from the atmosphere, and when the whole decompose, the one half is added to the fertilizing properties of the soil in store for the coming year.

That it should grow weeds and thorns and thistles but adds to the blessing; while in the "sweat of thy face shalt thou eat bread," was a blessing outnumbering the sands of the

sea-shore: for an idle man is the greatest curse to himself, and to those around him.

Having no motives to action, he is for ever wavering and halting betwixt two opinions, which are of no moment if either were true. His mind is for ever irritable and unhappy by reason of its inanity; and the feeling of imbecility, in his spleen towards every body, assures him to be the object of his own contempt.

His chief pleasure consists in eating, drinking, and sleeping; but his highest pleasure is the *pain and humiliation* of those within the reach of his fitful and wayward temper.

Give to this being, miserable and wretched as he is, and miserable and wretched as he makes others, give him employment for his hands, heart and head, by "the sweat of his brow," and the directive tendencies of the gangrene within are thrown outward into motives of action; roused by hope, his spirit is renewed, and he at once becomes a man, imparting and receiving blessings.

RECONCILIATION.

Reconciliation is the central point of Christian doctrine, and the question would have long since ceased to be a subject of strife and collision, if *reconciliation* had not been made to imply an existing difference betwixt two parties,—a state of disagreement on equal terms.

The simple law of physics I have so often quoted determines this question. Forces that are equal are of opposite momenta, while forces that are unequal attract each other, and must mutually harmonize for the support of each other.

It is the stronger force that supports the weaker, bound to it by the immutable relations of the law.

St. Paul seems to have had a clear idea of this definition of the law, when he says, 2d Cor. 5th chap. 20th verse, "We pray you in Christ's stead, be ye reconciled unto God," and in the 19th verse, "To wit, that God was in Christ reconciling the world unto himself,

not imputing their trespasses unto them;" which, when explained as it is by the law, simply means that man, whatever may be his sufferings, should be reconciled to God for the evils that causation necessarily imposes on him. And when the mind arrives at that eminence from whose summit it can grasp the blessings of *eternal life*, it will perceive the insignificance of its physical, moral, and mental evils, and rejoice in every trial of its experience that brings it nearer and nearer to the "hope set before it in the Gospel."

DEATH AND RESURRECTION OF THE SAVIOUR JESUS CHRIST.

Every age has clothed the Scriptures in a dress not its own, borrowed from its own peculiar form of thought, and yet, under every modification, there remains something unchanged and enduring.

We are now coming to another era in the history of man, and we approach it with all the feeling and solemnity that is due to a sub-

ject always to be treated with deference and awe, where the Saviour of mankind forms one of the personages in the great drama of life.

Adam was created four thousand and four years before the birth of Christ; and in that long period of germination in the human mind, there were three important epochs in its history, directly calculated to test the ability of man to get on without a Saviour; and, under every kind of teaching and admonition adapted to his state, each experiment in succession failed.

If Christ was to have appeared an offering for *sin alone*, is it supposable that a just and wise God would have delayed it four thousand years, and allowed the successive generations of that extended period to live and die without hope, not knowing whither they were going—with no assurance of a world to come; and if they *had*—no assurance of what that world would be? No; if Christ was to appear an offering for sin alone, as soon as the world was prepared for it, it would have been unjust to man to have delayed it.

There was no reason in delay for the want of moral guilt, but there was ample reason in delay in the mental darkness of the age.

The Scriptures have pointed out, in the plainest possible terms, the whole moral law, and enforced its obligations on the interests and affections of men. Yet at the same time, while it enforces moral obedience, with penalties for default, it does not point out so clearly man's ability or inability to obey.

This is a remarkable omission, that, in enforcing moral obedience, man's lower range of faculties should be appealed to, and his pure intellect, in which his responsibilities rest, should be overlooked. The omission is clearly designed to show the mental darkness of the age, in connection with the prophetic knowledge of the disproportion in the diligence with which the race would afterwards cultivate their mental, at the expense of their moral faculties.

In the progression of the human mind, instruction must be adapted to its altered circumstances. It is quite clear, if a moral law

was now to be promulgated to a people with two thousand years of added experience and cultivation, that it would be alike addressed to their moral and mental condition. And it appears but reasonable to suppose, at this time, that the law of mind, if understood, will unfold a more clear conception of our moral responsibility, and sink the fathom line deeper into our moral nature.

If the law of causation be true in its progressive work, that 4000 years was patiently spent by the Son of God in bringing the race of man forward out of his low estate, and training his mind to meet the advent of the Messiah, with some understanding of the prophecy that had been so long foreshadowed; and that he might avail himself of an event foretold to him from the foundation of the world, printed on the leaves of the Old Testament, and guiding his mind gradually toward the mighty truth; but still unable to grasp it, till the dreadful reality testified to the solution of the grand problem of the death and resurrection of Jesus Christ from the dead.

This mighty intervention of God the Son opened an outlet to the human mind; and the law of causation, by means of this special act, having escaped the emergency that was foreseen must occur to the general law, flowed on, in the unbroken order of its course, fulfilling its eternal destiny, in conformity with the will of the mighty God that made it. But for this noble intervention of the Saviour, who by this act "magnified the law and made it honorable," its adjustment would have been sundered, the mechanism of the universe tumbled back into Chaos, and the race of man lost in annihilation. Already more than four thousand years had been expended in teaching man the Way of Life, and yet he knew not how it was. Still supposing death to be the end of his being, his mind was chained to that hopeless belief, and that his end was like the beasts that perish. Here he was approaching a stand, while causation must go on or be broken.

And then appeared that *special providence*,

prepared from the foundation of the world, to meet this emergency of the general law.

Every other trial had failed in teaching man the way of life, and no other expedient could the Father devise than the one foreordained from the beginning, to send His only Son, to show him *how to live*, and *how to die*, and *how to rise again*. How sublimely simple! how eminently just! how kind and merciful! Would it have been better that creation should have had no beginning;—or if begun, better that it should have been recalled from its course and re-ordered into Chaos, than that the Son of God should not have died and rose again, to show to us the way of life and magnify the general law?

In contemplating the life, death, and resurrection of the Saviour, we behold three leading motives that led to the sacrifice, all co-equal, co-eternal, and co-important. If there be any magnitude attached to one over another, it may posssibly rest upon the last, as the resurrection saved the race from annihilation, and the mechanism of the world from

ruin. But in the act of showing man how to live, and how to die, the sacrifice contemplated but one object, and that one to save man from the moral degradation that dethroned him from his primal state by reason of his disobedience of the divine command. And it appears to me that every page of the Bible is laid under contribution to illustrate, explain, and enforce that great truth. The whole plan of creation and redemption was conceived in sorrow. Man was contemplated in sorrow before the foundation of the world, for God foreknew he would sin. He was afterward, in pursuance of the same foreknowledge, created in sorrow, was born in sorrow, and is perpetuated in sorrow to this hour, and hence a "godly sorrow for sin" prevails at this hour—but supported by the just expectation of a glorious era. It is sin that causes this sorrow; an evil that should fill every heart with sorrow, and every mind with watchfulness and care.

In this respect the Bible is the hope set before us, and the veriest outlaw that stalks

abroad at noonday, or the thief that hides his footsteps in the night, or the assassin who conceals his weapon from his victim, is a better man for the Bible than he would have been without it.

The physiology of that exalted being, the Son of God, in the assumption of our nature, is as sublimely simple as that of man; but it is not our purpose to introduce it here. It is sufficient that it acknowledges the sublime character of the Saviour to be something more than a great reformer and philanthropist. It honors him as the Divine Messiah, whom the prophets celebrated as the Universal King, the Prince of Peace, the Lord our righteousness, whose kingdom is everlasting, and whose throne endureth for ever.

GENERAL AND SPECIAL PROVIDENCE CONSIDERED IN REFERENCE TO THE GENERAL LAW.

The operations of a law of unbounded generality, running on in the regular succession of its own phenomena, would resolve all its

acts into fate or necessity, but for the intervention of a special providence. Law implies parties to its enactments; and as there were but two individuals, the Son in his pre-human state, and the Father, they are presumed to have agreed to the principle of the general law. The fate or necessity in the general law then, could only be met by succeeding conditions, agreed to by the parties themselves, in which the acts or series of acts of a special providence may coexist, and become coequals, and yet carry out the great principle of the general law.

If we follow strictly the narrative of ancient history, we shall come to an agreement which unfolds the conditions on which a general and special providence is founded. Throughout the whole of the first chapter of Genesis up to the 26th verse, Jehovah is speaking in the singular number; and his language implies the pre-ordination of a general law, held in restraint by his sovereign will. He uses nothing but the commanding verb, "let," to bring out every successive phenomenon of

light, heat, and matter, up to that of animal life.

At the 26th verse is a pause; the whole language is changed, and there is admitted a copartnery with the Son in finishing the work: "Let us make man after our own image and likeness." Here the Son and Saviour came in as copartner in making man.

Now when the conditions of a copartnery are not expressed, they are implied, and the terms are supposed to be coequal. If they are not coequal, express conditions become a necessary predicate of the subsequent relations.

The terms in this case then were coequal, and man was made in the unbroken order of the law of causation, monarch of matter, with dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the face of the earth.

If we pass over the second chapter to the 22d verse, which is merely an introductory notice to Adam, of things which were made for him, and over which he was to exercise

dominion, we find it there announced, that Eve was made for him also, and that she was to be his help-meet. The starting point of her physical structure begins where Adam's ended, and her whole framework is of a higher order of mechanism than that of man, more delicate, more sensitive, having more tact, more sagacity; and as a *judge of propriety* in all things, he should regard her as his counsellor.

The opening of the third chapter commences with the interview betwixt Eve and the serpent, over whom Adam had entire dominion, and through whose cunning Eve transgressed and Adam followed in the sin. Having shown the inference drawn from this transgression not to be the true one, we pass on in the track of the narrative to a covenant, which lays the whole Bible under contribution in proof of its truth; namely, that after the transgression, the copartnery was dissolved, and Christ, the Son of God, became sole heir of the Kingdom, with full power, authority, and dominion.

In this transfer, man was taken from the hand of justice, which represents the Father, and placed under a government of mercy, which represents the Son, when he became the recipient of all its expanded sympathies and tender relations.—All arguments which have attempted to reconcile these attributes of justice and mercy in the same Being, seem to have left a chasm for the speaker to leap over; while the arguments themselves have rather tended to "embroider the veil than lift it up." The attributes in themselves considered are totally irreconcilable, as the following analysis will show.

First.—Justice is an attribute of the pure intellect; while mercy is a moral attribute, and classes itself with the feelings and affections.

Secondly.—Justice draws its lines sternly about itself, is unapproachable, and uncompromising, and balances its scales in equal and exact adjustment; while mercy listens to every feeling, lends herself to every emotion, and metes out her measure in liberal proportions to every want.

Thirdly.—Justice looks to the preservation of its own attributes; while mercy looks to the preservation of its object.

Fourthly.—Justice loses all by *giving any*; while mercy gains by giving.

There is no point of contact, or harmony of agreement in these two attributes; they cannot be mingled together without violating each other, in the infinite mind.

The whole question then of a general and special providence, rests on the *right* of the parties to enter into, and dissolve their copartnership, and turn man over to a Saviour. If this is admitted, all debate ends; and justice and mercy stand reconciled to each other in the order of their relation; showing that God the Father presides over the general law, while Christ the Son is working out the problem of a special providence.

It is likewise clear that man, under the operation of the general law, is working as true to his nature as the sun to its course. It is only with the special law that he comes in conflict, and in which his acts are the only

exception to the acts of the general law, while for him a special provision is made by the intervention of a Saviour.

BENEFICENT DESIGN IN THE NECESSITY OF EVIL.

Having shown beneficent design in the origin and cause of evil, from the pre-human period; and traced it, by the law of causation, through the physical and vital properties of matter up to that of a general and special providence, we come in conclusion to show beneficent design in the necessity of evil.

We have already shown the perfection of the general law in its ultimate work; but have only hinted at the stormy necessities through which it has passed under the observation of man; not venturing to cast back a thought upon that dark and dreary night of its troubled pilgrimage, before the sun had ever pierced the gloom that mantled its birth.

With what feeling did the Father and the Son watch the progress of that law, through

revolving centuries; each century, and each year in every century, working its way nearer and nearer to that dreadful emergency which the law contemplated from its beginning; in which the Son of God was to lay down His life, and rise again, to open to man's vision the way of life from this world to the next in course, and to assure him that he, too, was to live again. With the addition of 1800 years' experience and observation of its course, together with all our multiplied attainments; with a full knowledge of the law of combination, decomposition and recomposition; there is no one feature in the general law to teach man at this time the way of life, and assure him that he is to live again. If Christ's death had been delayed till now, the reality of the resurrection of life would still be unknown.

While the law, however, contemplated but one emergency, and that mighty in its effects and operations, it was filled with necessities.

Its first and leading necessity was to adjust it to a principle that would sustain it in per-

petual operation, always fulfilling its destiny, and yet designed never to reach an end.

The second involved the necessity of evil, that of making its individual parts *imperfect*, and yet adjusting their combinations to a scale of continued elevation, rising in silent progress towards a receding end. If the law had been equipoised on a lower scale of adjustment it would have left man a beast; if on a higher, it would have transformed him to a God.

A statement of the remainder of its necessities would make other volumes larger than this, but having reached the proof of beneficent design in the necessity of evil, I have arrived at the limit which the problem assigned me. I may write again. I anticipate a stormy reception of this little volume; and I may be called on to defend it.

The structure itself is not so much open to attack as the arrangement of the windows, that let in the light;—but the reader will remember that the work has been done in a transition state, from a Journeyman toward

that of a master builder, which the law shows he will never reach, and that he must always remain a

"JOURNEYMAN."

February 25, 1849.

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